Just for your Tandy Color Computer 1, 2 and 3

February 1989 Canada $4.95 U.S. $3.95

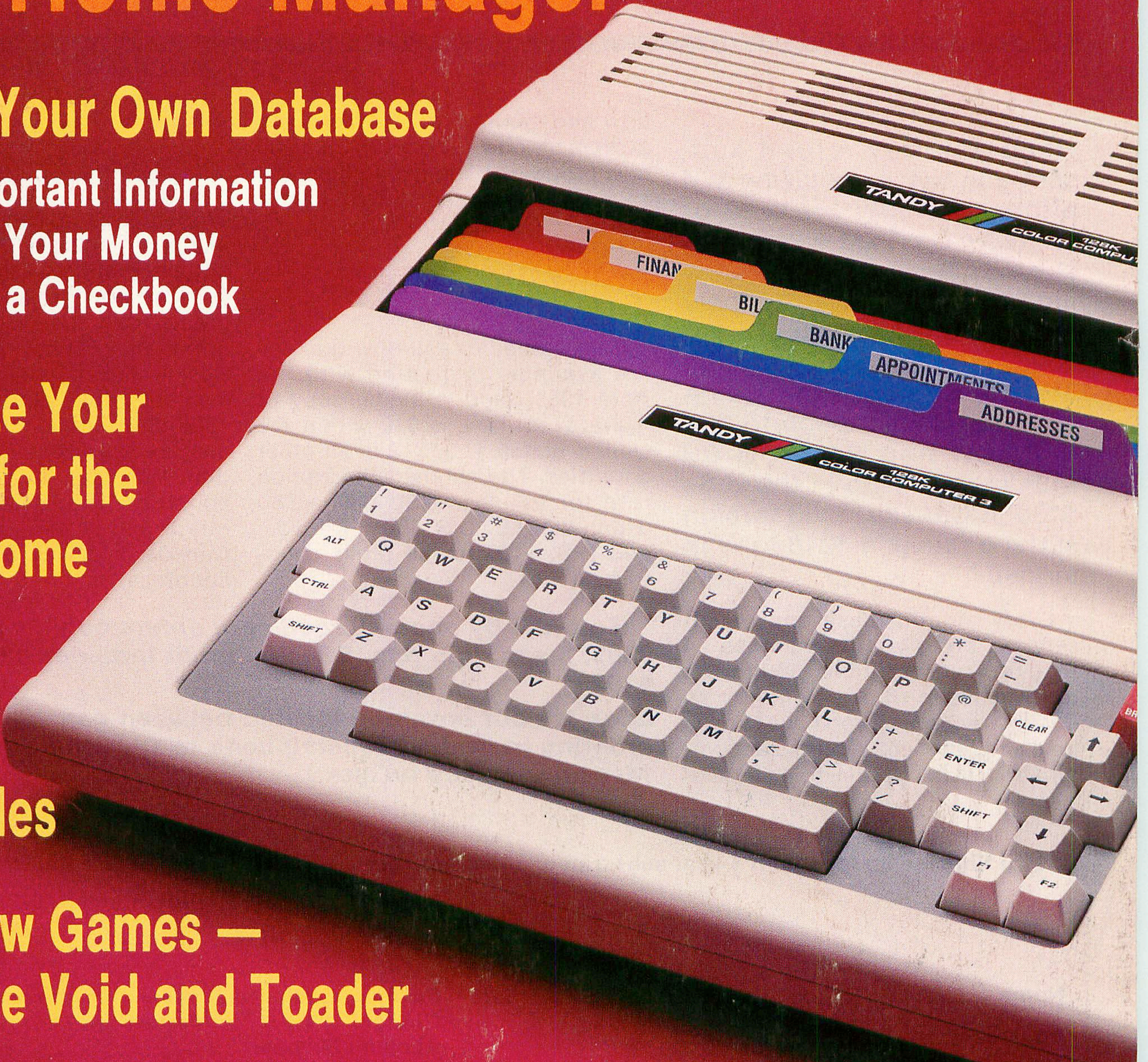
The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

The Home Manager

Set Up Your Own Database

- File Important Information
- Manage Your Money
- Balance a Checkbook


TANDY
128K COLOR COMPUTER
FINAN
BIL
BANK
APPOINTMENTS
ADDRESSES
TANDY
128K COLOR COMPUTER 3

Organize Your Search for the Right Home

Plan Daily Schedules

Two New Games — The Blue Void and Toader

02
0
44254 00001

A Single-Key/Puff Switch Calculator and an Automated Household-Function Controller for the Physically Handicapped

Still pounding away at that keyboard?

December 1987
August 1987
January 1988
The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
Just for your Tandy Color Computer 1, 2 and 3
RAINBOW ON DISK
RAINBOW on tape
FEBRUARY
DECEMBER
SEPTEMBER
OCTOBER 1986
Our Beginners Issue
Get started
Take CoCo
Create your

Save Time and Money with a Combination Subscription!

SAVE up to 19%

when you buy a joint subscription to the magazine and either RAINBOW ON TAPE or RAINBOW ON DISK! A one-year subscription to THE RAINBOW and RAINBOW ON TAPE is only $91 in the U.S., $108 in Canada, $153 foreign surface rate and $188 foreign airmail. A one-year subscription to THE RAINBOW and RAINBOW ON DISK is only $115 in the U.S., $138 in Canada, $183 foreign surface rate and $218 foreign airmail.*

Every month, these convenient services bring you as many as 24 ready-to-run programs. Using the current issue of THE RAINBOW as documentation, all you have to do is load and run them. A one-year combination subscription to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK give you more than 230 new programs! The typing time you save can be spent enjoying your CoCo!

RAINBOW ON TAPE
For No-Fuss Fun

Back issues of RAINBOW ON TAPE are available beginning with the April 1982 issue. A single copy of RAINBOW ON TAPE is $10 within the United States; U.S. $12 in all other countries. The annual subscription rate for RAINBOW ON TAPE is $80 within the U.S.; U.S. $90 in Canada; and U.S. $105 for all other countries.*

RAINBOW ON DISK
Offers OS-9 Programs

In addition to all the programs offered on tape, part of one side of RAINBOW ON DISK is formatted for the OS-9 operating system. That means you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. Back issues of RAINBOW ON DISK are available beginning with October 1986. Subscriptions to RAINBOW ON DISK are $99 a year in the U.S. Canadian rate is U.S. $115. All other countries, U.S. $130. Single copy rate is $12 in the U.S.; U.S. $14 in Canada; and U.S. $16 in all other countries.*

To order by phone (*credit card orders only*), call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

Look for our envelope located between pages 66 and 67 for ordering individual subscriptions to THE RAINBOW, RAINBOW ON TAPE and RAINBOW ON DISK.

YES! Sign me up for a joint 1-year subscription (12 issues) to:

☐ **THE RAINBOW and RAINBOW ON TAPE**

☐ **THE RAINBOW and RAINBOW ON DISK**

☐ **NEW** ☐ **RENEWAL** (attach labels)

Name ______________________________

Address ______________________________

City ______________ **State** ________ **ZIP** ________

Payment Enclosed ☐ **(*payment must accompany order)**

Charge: ☐ **VISA** ☐ **MasterCard** ☐ **Am. Express**

Account Number ______________________________

Signature ______________________ **Exp.** ________

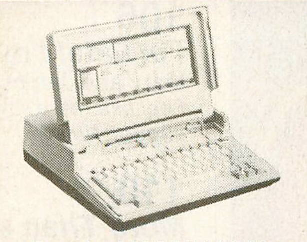
*U.S. currency only, please. In order to hold down costs, we do not bill. Kentucky residents add 5% sales tax. Please allow 6 to 8 weeks for delivery of first copies. Joint subscriptions to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK begin with the current issue.

Please note: While group purchases of RAINBOW ON TAPE and RAINBOW ON DISK are permitted (and multiple subscriptions are even discounted, if purchased in one order from a club), no license to make copies is conveyed or implied. Yes, your group may even purchase a subscription to our disk/tape services, but such purchase in no way authorizes that *any* copies be made of that original disk/tape. Specifically, this means that the original disk/tape itself may indeed be kept in a club library for use by members. However, a group purchase *does not* entitle club members, individually or as a group, to copy that disk/tape.

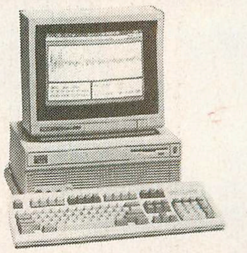
Unauthorized copying of any copyright product is strictly illegal. The copyright (right to make copies) is in no way conveyed in the purchase transaction.

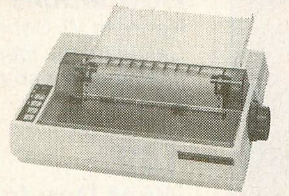
From Computer Plus to YOU . . .

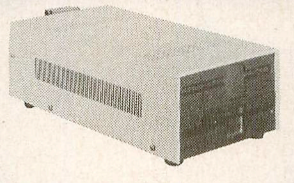
PLUS *after* PLUS *after* PLUS

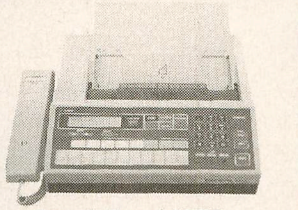

Tandy 1400 LT $1369
Tandy 102 32K $439
Tandy 200 24K $429*

Color Computer 3
w/128K Ext. Basic $159


Tandy 1000 SL $689
Tandy 1000 TL $969


DMP-132 $289


Color Computer Disk Drive
Drive 0 $179* Drive 1 $149


TandyFax $1029

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 HX 1 Drive 256K	439.00*
Tandy 1000 TX 1 Drive 640K	799.00*
Tandy 3000 NL 1 Drive 512K	1279.00
Tandy 4000 1 Drive 1 Meg.Ram	1959.00
Tandy 5000 MC 2 Meg. Ram	3799.00
PRINTERS	
Radio Shack DMP-106 80 CPS	**145.00***
Radio Shack DMP-132 120 CPS	**289.00**
Radio Shack DMP-440 300 CPS	**549.00**
Radio Shack DWP-230 Daisy Wheel	349.00
Tandy LP-1000 Laser Printer	1899.00
Star Micronics NX-1000 144 CPS	199.00
Star Micronics NX-1000 Rainbow	269.00
Panasonic P-1080i 144 CPS	199.00
Panasonic P-1091i 194 CPS	249.00
Panasonic P-1092i 240 CPS	369.00
Okidata 320 300 CPS	369.00
Okidata 390 270 CPS 24 Wire Hd	515.00
NEC Pinwriter P-2200 170 CPS	399.00
MODEMS	
Radio Shack DCM-6	52.00
Radio Shack DCM-7	85.00
Practical Peripheral 2400 Baud	229.00
Practical Peripheral 1200 Baud	149.00

COLOR COMPUTER MISC.	
Radio Shack Drive Controller	99.00
Extended Basic Rom Kit (28 pin)	14.95
64K Ram Upgrade Kit (2 or 8 chip)	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HI-RES Joystick Interface	8.95
Color Computer Deluxe Mouse	44.00
Multi Pak Pal Chip for COCO 3	14.95
PBH Converter with 64K Buffer	119.00
Serial to Parallel Converter	59.95
Radio Shack Deluxe Joystick	26.95
Magnavox 8515 RGB Monitor	299.00
Magnavox Green or Amber Monitor	99.00
Radio Shack CM-8 RGB Monitor	249.00
Radio Shack VM-4 Green Monitor	99.00
PBJ 0K COCO 3 Upgrade Board	19.95
PBJ 512K COCO 3 Upgrade	159.00
Tandy 0K COCO 3 Upgrade Board	24.95
Tandy 512K COCO 3 Upgrade	149.00

COLOR COMPUTER SOFTWARE	TAPE	DISK
The Wild West (CoCo3)		25.95
Worlds Of Flight	34.95	34.95
Mustang P-51 Flight Simul.	34.95	34.95
Flight 16 Flight Simul.	34.95	34.95
COCO Util II by Mark Data		39.95
COCO Max III by Colorware		79.95
Max 10 by Colorware		79.95
AutoTerm by PXE Computing	29.95	39.95
TW-80 by Spectrum (CoCo3)		39.95
TeleWriter 64	49.95	59.95
TeleWriter 128		79.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo 3 512K Super Ram Disk		19.95
Home Publisher by Tandy (CoCo3)		35.95
Sub Battle Sim. by Epyx (CoCo3)		26.95
Thexder by Sierra (CoCo3)		22.45
Kings Quest III by Sierra (CoCo3)		31.45
Flight Sim.II by SubLogic (CoCo3)		31.45
OS-9 Level II by Tandy		71.95
OS-9 Development System		89.95
Multi-View by Tandy		44.95
VIP Writer (disk only)		69.95
VIP Integrated Library (disk)		149.95

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog

*Sale prices through 1/30/89

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

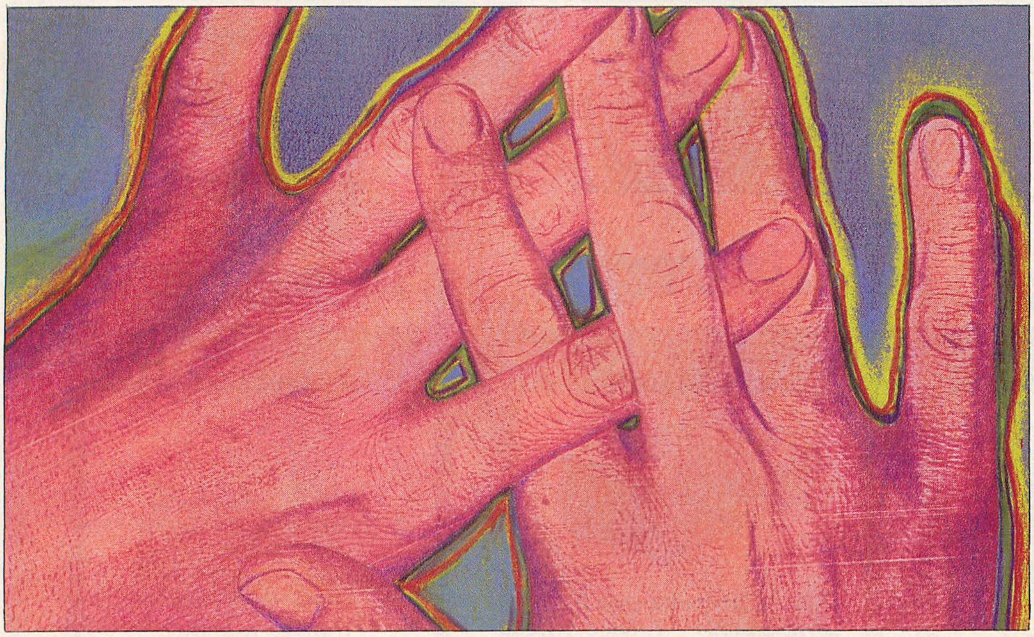
IN MASSACHUSETTS CALL (508) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

RAINBOW

Table of Contents

February 1989
Vol. VII No. 6



58

Features

28
Tangled Tiles
Gay Crawford
How many tiles do you want scrambled?

36
The Do-It-Yourself Database
Richard Perlman
Subroutines and program code for home management

43
It's a Toad's Life
Christopher Dunn
Some days it doesn't pay to leave the lily pad

50
Just One Touch — Just One Breath
Eric Mims
CoCo makes calculations easier for the disabled

58
Hands-Free Computing
Dennis H. Weide
A program using computer-operated equipment for paralyzed persons

80
A Patch for a Patch
Randall Reid
Do your assembly language programming on the wide, 80-column screen

96
And More Math
William P. Nee
Part VIII: Machine language made BASIC

101
The RAINBOWfest Reporter
Lauren Willoughby
The scoop on the Princeton scene

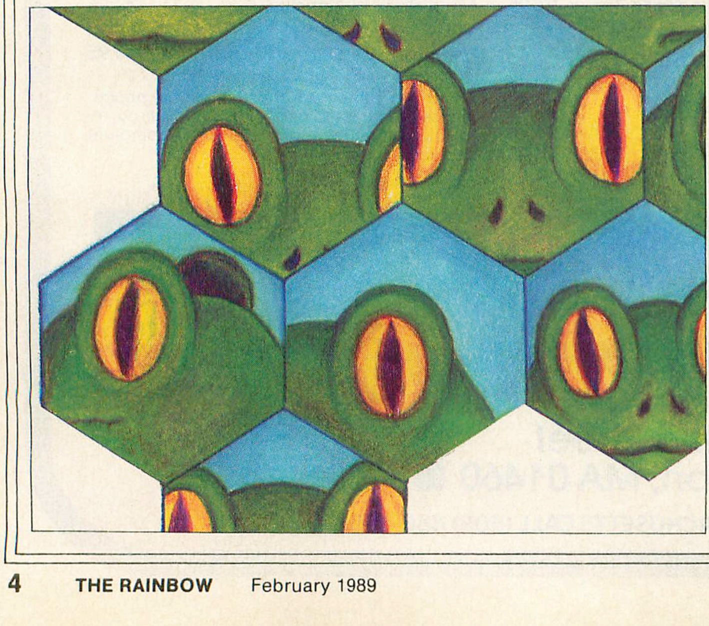
106
I'm Late! I'm Late!
Mary and James Lamonica
Feel like there's never enough time?

110
More Than a House
Richard K. Johnson
Let CoCo organize your search for the right home

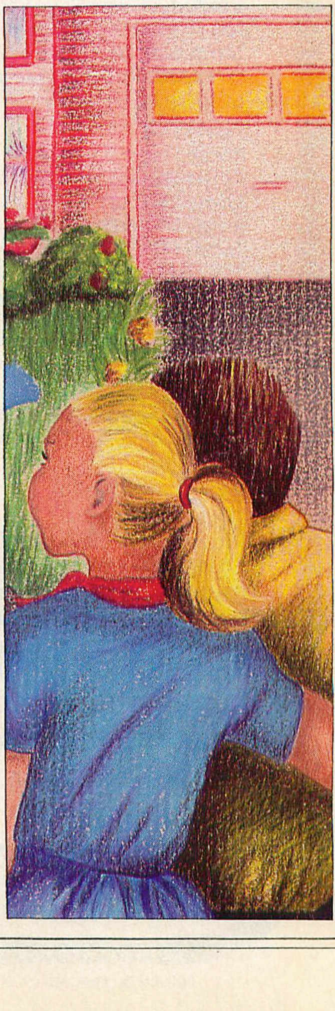
112
How Much?
Kenneth W. Johnson
Calculate the monthly payments for any loan amount

142
What Day Is It?
Richard Ries
If OS-9 date entries seem a little backward, this utility can help

43



110



Novices Niche

87
Keeping Your Balance
Jerry Yates

88
Applying Labels
Ana M. Rodriguez

88
Custom Cassette Labels
Travis Halbrook

89
Knee-High to a Growth Chart
Gay Crawford

89
CoCo Says . . .
Warren Massie

90
Towers of Hanoi
Dan O'Brien

91
Boggling Your Mind
Russell Riley, Jr.

91
The Building Blocks of Graphics
Keiran Kenny

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on the inside front cover.

Departments

Advertisers Index 160
Back Issue Info 149
CoCo Gallery 26
Corrections 76
Letters to Rainbow 6
One-Liner Contest Information 63
Racksellers 158
Rainbow Info 14
Received & Certified 141
Submitting Material to Rainbow 72
Subscription Info 64

Columns

46
BASICally Speaking
Bill Bernico
BASIC problems solved here

92
CoCo Consultations
Marty Goodman
Just what the doctor ordered

99
Doctor ASCII
Richard Esposito
The question fixer

105
Education Notes
Steve Blyn
The blink of an eye

BASIC Training, Delphi Bureau and Turn of the Screw will return next month.

10
PRINT#-2,
Lawrence C. Falk
Editor's Notes

82
Wishing Well
Fred Scerbo
Count on CoCo

Rainbowtech

144
Barden's Buffer
William Barden, Jr.
Food for worms

152
KISSable OS-9
Dale L. Puckett
Advances in OS-9 technology

Accessible Applications will return next month.

Product Reviews

Arizona's Hard Drives/*Arizona Small Computer Peripherals* 138
Bash/*Game Point Software* 130
Buried Buxx/*JR & JR Softstuff* 129
Deluxe Icon Editor/*Puritas Springs Software* 136
Diskman II/*Tothian Software* 139
Frogday Afternoon/*K-Soft* 136
MacPlay/*CoCoTech* 126
MAESTRO/*Marc Campbell Innovations* 127
Pokes, Peeks 'n Execs/*Microcom Software* 126
Rad Warrior/*Tandy Corporation* 134
TypeMate/*Tandy Corporation* 130
Warrior King/*Sundog Systems* 131
Warp Fighter 3-D/*Game Point Software* 134
Window Master/*Cer-Comp, Ltd.* 124

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW**, **RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered ® trademarks of FALSOFT, Inc. • Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada. • Entire contents copyright © by FALSOFT, Inc., 1988. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. • Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp. • Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. • Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

The Rainbow

Editor and Publisher
Lawrence C. Falk
Managing Editor Jutta Kapfhammer
Associate Editor Sue Fomby
Reviews Editor Lauren Willoughby
Submissions Editor Tony Olive
Copy Editor Beth Haendiges
Technical Editors Cray Augsburg, Ed Ellers
Technical Assistant David Horrar
Editorial Assistants Wendy Falk Barsky, Sue H. Evans
Contributing Editors
William Barden, Jr., Bill Bernico, Steve Blyn, Tony DiStefano, Richard Esposito, Martin Goodman, M.D., Joseph Kolar, Dale Puckett, Fred Scerbo, Richard White
Art Director Heidi Maxedon
Designers Sharon Adams, Teri Kays, Denise Webb
Typesetters Linda Gower, Renee Hutchins

Falsoft, Inc.

President Lawrence C. Falk
General Manager Bonnie Frowenfeld
Asst. General Mgr. for Finance
Donna Shuck
Admin. Asst. to the Publisher
Sarah Levin
Editorial Director John Crawley
Asst. Editorial Director Judi Hutchinson
Senior Editor T. Kevin Nickols
Director of Production Jim Cleveland
Chief Bookkeeper Diane Moore
Dealer Accounts Judy Quashnock
Asst. General Manager For Administration
Sandy Apple
Word Processor Manager
Patricia Eaton
Customer Service Manager
Beverly Bearden
Customer Service Representative
Carolyn Fenwick
Development Coordinator Ira Barsky
Chief of Printing Services Melba Smith
Dispatch Michael Willis
Business Assistants Laurie Falk, Vivian Turbeville
Chief of Building Security and Maintenance
Jessie Brooks
Advertising Coordinator Doris Taylor
Advertising Representatives
Belinda Kirby, Kim Vincent
Advertising Assistant Debbie Baxter
(502) 228-4492

For RAINBOW Advertising and Marketing Office Information, see Page 160

Cover photograph copyright © 1989 by John R. Longino

Art direction by Heidi Maxedon

Letters to the RAINBOW

OS-9 Pride

Editor:

Several years ago I bought my first CoCo — a 16K CoCo 2 with ECB and a CCR 81. Getting started was an ordeal — so much to learn and no one who shared my interests. Later I got a CoCo 3, and soon after that I was introduced to THE RAINBOW.

When I first saw THE RAINBOW in the bookstore, it was a sight for sore eyes. I could find no one in the local Radio Shack stores who knew about CoCos. The articles, ads and particularly the information on OS-9 opened up my world. I started adding to my machine — slowly.

By the time I had read a few months of THE RAINBOW (particularly Dale Puckett's column), I was ready to go for broke with OS-9. I was overwhelmed by the amount of information to digest, but soon I was involved in *The Complete Rainbow Guide to OS-9* and OS-9 Level II: *A Beginner's Guide to Windows.*

Once I had my system up and running, things really started to click. Now I feel like I'm in a whole new world. I quit my job and I'm back in school — taking computer programming courses. I love your advertisers and my new vocation. My only gripe is that I use MS-DOS machines at school. Those computers are like souped-up chain saws with dull chains. By comparison, OS-9 is so much more . . . everything. Those 16-bit tools may get the job done a little faster, but I have more fun with my CoCo 3. Many of you may say that OS-9 is difficult to learn, and maybe it is. But it's an affordable system that is very powerful. In a lot of ways it makes MS-DOS hide its head in shame. Just think: All this from a little 8-bit game machine.

Shan J. Gil
Polson, Montana

HINTS & TIPS

Editor:

Just wanted to pass on a little help. I have finally found the printer codes I needed to get William J. Holdorf's *Appointment Calendar* (January '88, Page 100) to work with my system. If there are any other CoCo users with a SG-10 who are having trouble with the head controls in lines 2290 and 2340, my fix involves the "Skip 'n' Print Position." Modify lines 2290 and 2340 in the following manner:

```
2290 PRINT#-2,CHR$(27)CHR$(98)CHR$(3)
2340 PRINT#-2,CHR$(27)CHR$(98)CHR$(11)
```

You must also modify the `DATA` statements in lines 1690 and 1700 to center the month over the calendar.

If anyone has a fix to *DIR Print*, (February '88, Page 80) that works like mine, please let me know. My prints are still single-column (or double-column if I substitute `CAT` for `DIR`). All my printer codes check out.

Jerry R Ryals
HHC DISCOM, Box 151
Third Infantry Division
APO NY 09701

Need More Time?

Editor:

I enjoyed Mark Webb's *Stock Ticker* (November '88, Page 45), I felt that I would enjoy it more if the bar chart remained on the screen a little longer. I'd like to share the following modification that Mark sent me:

```
1130 FOR PAUSE=1 TO 1500:NEXT PAUSE
1130 RENUM TO 1131
1131 RENUM TO 1132
1132 RENUM TO 1133
```

I sure hope Mark will continue to contribute programs to THE RAINBOW. Does he have any more good material up his sleeve?

Allen Clark
St. Donat, Quebec

BACK TALK

Editor:

In answer to Andrew Martin's request for a patch to get *Profile* to run on Level II, here are patches for both the *Profile* and *MGT* programs. Both programs try to link to the `SysGo`, which is called `CC3GO` in Level II and does a checksum on the module and then on the shell. I got around the first problem by renaming `CC3GO`, but the checksum on the shell gave me a "This is not a Color Computer" message.

The following patches change the execution offset of the modules past the checksum and move the first two instructions of the program to this new starting point. Use these patches on backup copies only. The Level II package does not include a `SAVE` command. However, the Level II developer's package does. You can also use Level I's `SAVE` command.

Use the `BUILD` command to create these files. Enter each line as shown:

```
l profile
c 09 11 12
c 1227 81 32
c 1228 59 c9
c 1229 26 04
c 122a f5 13
c 122b 35 9f
c 122c 70 09
v

l mgt
c 0a 00 43
c 543 81 32
c 544 59 c9
c 545 26 04
c 546 f5 13
c 547 35 9f
c 548 70 09
v
```

Then enter the following command lines:

```
load profile
modpatch propatch
save /d0/cmds/profile profile
unlink profile
load mgt
save /d0/cmds/mgt mgt
unlink mgt
```

Follow these lines and your profile disk will work on Level II. The only problem I have found with this patch is that on the startup screen the listing of address files does not always include all files. However, if you type the files' names, they will be loaded into memory properly. The program will work on an 80-column screen.

John Kwiatkowski
Wilmington, Delaware

INFORMATION PLEASE

Editor:

Is there anyone out there with an RS DMP-105 printer who has gotten the two January '88 programs, *Appointment Calendar* (Page 100) and *Job Description* (Page 106), to print properly? If so, I would appreciate some help.

In addition, I'd like to hear from anyone in the Las Vegas, Nevada, area who has a CoCo 2 or 3 and a DMP-105. There are no clubs in this area; maybe we can start one.

Carl Rexrode
6500 W. Charleston, #76
Las Vegas, NV 89102

For `CALENDAR`, *change* `CHR$(3)` *to* `CHR$(2)`, *and change* `CHR#(45)` *in the same line to* `CHR$(155)`. *This will correct the head positioning.*

For `JOBDESC`, *delete Line 900 and replace it with* `900 GOTO 920`. *This will defeat the printer-online test. Otherwise, the program should run fine on the DMP-105.*

RUNS ON COCO 2 & 3

AUTOTERM
TURNS YOUR COLOR COMPUTER INTO THE
WORLD'S SMARTEST TERMINAL!
YOU'LL ALSO USE AUTOTERM FOR SIMPLE WORD PROCESSING & RECORD KEEPING

EXTRA FEATURES ON COCO 3 DISK
80 char. screen, 2400 baud thru serial port,
95,000 to 475,000 character buffer.

EASY COMMUNICATION + WORD PROCESSING + TOTAL AUTOMATION

EASY COMMUNICATION
Full prompting and error checking. Step-by-step manual has examples. Scroll text backward and forward. No split words on screen or printout. Save, load, delete files while on line. Print, save all or any part of text. 300 or 1200 baud. All 128 ASCII characters. Works with D.C. Hayes or any modem. Screen widths of 32, 40, 42, 51, 64.
DISK VERSION SUPPORTS RS232 PAK, XMODEM and SPLIT SCREEN FOR PACKET RADIO.

Please hire the mentally retarded. They are sincere, hard working and appreciative. *Thanks!*
Phyllis.

WORD PROCESSING
Editing is super simple with the cursor. Find strings instantly too! Insert printer control codes. Specify page size and margins. Switch quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text or files, download information, file it, and sign-off; then edit the receive data, print it in an attractive format, and/or save it on file. Compatible with TELEWRITER.

CASSETTE $29.95
DISKETTE $39.95
Add $3 shipping and handling
MC/VISA/C.O.D.

TOTAL AUTOMATION
Advanced system of keystroke macros lets you automate any activity, such as dial via modem, sign-on, interact, sign-off, print, save. Perform entire session. Act as message taker. At start-up, disk version can automatically set parameters, dial, sign-on, interact, read/write disk, sign-off, etc. Timed execution lets AUTOTERM work while you sleep or play. No other computer can match your COCO's intelligence as a terminal.

PXE Computing
11 Vicksburg Lane
Richardson, Texas 75080
214/699-7273

REQUEST HOTLINE

Editor:

As a faithful reader of THE RAINBOW since September, 1982, I must say that your magazine has always been the best Color Computer magazine. In addition to its good articles, its reviews and comments have always helped me when buying both software and hardware.

Since 1989 will probably be the year for hard drives, it would be good to have a comprehensive article on this — comparing hardware and offering help about partitioning OS-9 and BASIC.

I hope to see such an article soon. Keep up the good work.

Eduardo S. Prado, Jr.
San Paulo, Brazil

Dr. Martin Goodman, M.D. has been diligently working on such an article. Expect to see it in next month's "More Power to Ya!" issue.

Let's Compare

Editor:

I like THE RAINBOW's reviews of hardware and software, but is it possible to add some comparison of the various programs and hardware available? You could test the most-used printers, disk drives, word processors, etc. and compare their features. Maybe you could compile a table that identifies the features of various hardware or software.

Serge Cote
Hull, Quebec

See the upcoming issues of the RAINBOW *for more comparative-type features of this sort.*

KUDOS

Editor:

Five years ago I stood before a computer display and found myself unable to turn the unit on — much less have it do something useful. A couple of 10-year-olds not only turned it on but also managed to make it write their names and do whatever they chose. It was then that I decided I would not allow this technology to intimidate me any longer. I purchased my first CoCo. Slowly I became comfortable with computers both at home and at work. RAINBOW and RAINBOW ON TAPE and DISK made my education joyful and easy.

Games and programs like *VIP* and *Word Power* get regular use in our family, and my wife and our children are also computer-literate. Thank you and keep up the good work.

Herb Cober
Thedford, Ontario

Author! Author!

Editor:

I would just like to tell you how much my husband and I enjoy your magazine. I have enjoyed keying in some of the programs listed in your magazine. I have also bought one month of RAINBOW ON DISK and really enjoyed all the programs on the disk.

I especially want to thank Arthur Hallock for his program *Letter Writer* (April '88, Page 48). When I could not use the program with my printer, I wrote Mr. Hallock, and he immediately wrote to tell me where to make changes in the program. I have written to him since with more questions, and he has answered each query within a week.

I also want to thank Rick Cooper, who contributed the program *States* (September '88, Page 60).After I entered that program, I couldn't get it to run. When I wrote to Mr. Cooper, he was most helpful.

It is so surprising to get help from strangers, especially when they are not getting paid extra for it. Thanks to all.

Eileen M. Huggins
Salem, New Hampshire

CONSUMER ALERT

Editor:

I understand that you make the money to publish your magazine from advertisements. However, I feel that I must write in reference to one of your advertisers: Hard Drive Specialist, of Houston, Texas. I placed an order with this company and charged it to my credit card. After two weeks and no merchandise, I called HDS. I got a real fast Texas Two-Step about back orders and availability. I waited another two weeks; still no merchandise. I called again. This time I was told that it would ship within one week.

Two days later, I found out that the order had been charged to my credit card 36 days prior to my last call. I called again and spoke with three people, the last one stating that she was the individual in charge of shipping. She started Two Stepping again about shipping within a week. I requested that the order be cancelled immediately and that the money be credited back to my credit card.

It has been 14 days since then, but I still have not received a credit back on my charge card.

As I have said, I understand that your magazine depends on advertisers. I just wish you had some way of eliminating companies like this.

Thank you for listening.

Melvin E. Mitts
Hinesville, GA

We have received a number of complaints from readers recently regarding Hard Drive Specialist. The company's advertising has been suspended from both THE RAINBOW and our sister publication, PCM, until improvement in its service is indicated.

A CoCo Success Story

Editor:

I suspect almost all of us have heard the condescending comments about the "Trash-80" Color Computer we own, about its limited memory, limited speed, limited everything. I'd like to comment on this.

I won a medal in national speech competition with a speech I wrote, edited, rewrote and formatted on a CoCo 2 (with the original software, no less). I'm 30 years old. Although I nearly did not graduate from high school and had been unemployed for three years, I graduated from a Commercial Foods and Management course as one of the top students because of the computer and math skills I gained on a CoCo 2.

I wrote a neat, two-page resume and printed 50 copies on my CoCo 2. Then I wrote two different forms of cover letters and wrote programs to insert the various addresses in them. Right out of school, I got six interviews, three job offers (one in management) and a a job. Of course, education made a big difference, but without my CoCo I would not have medals, self respect, new friends and a satisfying job.

Would another computer have served? I couldn't afford a different computer as a vocational student, so the point is moot. My CoCo was capable and paid for.

If people tell you that your CoCo isn't good enough, send them to me.

David B. Smith
Grand Portage, Minnesota

PEN PALS

- I am a 17-year-old Grade 12 student at St. Jerome's High School in Kitchener and would like to have pen pals from anywhere, but preferably close so we can meet sometimes. I have a 64K CoCo 2, one disk drive, a tape recorder and a DMP-130A printer. I like writing special-purpose programs and would like to help anyone with problems.

Anton Peter Milardovic
8 Smetana Dr.
Kitchener, ON
Canada N2B 3B8

- I am a 16-year-old male and would like to hear from anyone in the United States. I prefer someone around my age, but I will answer anyone. I have a 64K CoCo 2, CoCo 3, disk drive, cassette recorder, Multi-Pak, DMP-130, RS Speech & Sound Pak and *Orchestra 90*. I an interested in music, graphics, machine language, Adventures and games.

Orman Beckles
45 Meridian St.
Malden, MA 02148

- I am 16 years old and looking for pen pals aged 14 to 21. I am interested in everything about my computer. I have a 64K CoCo 2, one FD 500 drive and a DMP-110. I welcome letters from all over the world.

Bednarek Luc
Hanebergstr. 62
3960 Beverlo
Belgium

- I am 16 years old and have a CoCo 2 and 3. I use a cassette recorder but will soon add disk drives. My hobbies include computing, drawing and weight lifting. I prefer pen pals my own age.

Donald Kempton
P.O. Box 425
Athens, OH 45701

- I am 19 years old and have a 64K ECB CoCo 2, a disk drive, cassette recorder, and several printers. I would like to have a pen pal from anywhere in the United States, any age, any CoCo configuration.

Albert Noah
P.O. Box 1142
Marshall, NC 28753

- My brother and I are looking for pen pals from all over the country. We are: Scott, age 13, and Andy, age 14½. We have an ECB CoCo 2, DMP-105 and DMP-230 printers, DCM-3 modem, FD 502 disk drive, and a CCR-81 cassette recorder. We will do our best to respond to all letters.

Andy and Scott Brady
51 Barberton Road
Lake Worth, FL 33467

- I am 13 years old and would like some pen pals from all over the world. I own upgraded CoCos 1 and 2, a DMP-105, FD 502 and a Multi-Pak Interface. I love Adventure games and science. I will answer all letters — no age limits.

Juli Williams
Star Rt. 24-2A
Graford, TX 76045

- I am looking for a pen pal who has the same setup as my system. So far, I have a 64K CoCo 2 and a cassette recorder. I am looking for someone who is a novice like myself who might be able to teach me more about this new computer of mine.

Patti French
Rt. 2, Box 9
Grafton, ND

- I am 30 years old, and I would like a few pen pals. I have a CoCo 2, a CoCo 3, a FD 501 disk drive and a tape recorder. I like all games, especially Adventures, war and karate games. I would especially welcome hearing from ladies.

Steven Smith
1625 Parkside Dr. #B-5
Bowling Green, KY 42101

- I'm 31 years old and own a CoCo 2, tape recorder and a DWP-230. My interests are BASIC and assembly programming (practical programs for me and games for my kids) and word processing. My other interests are history, literature, politics and religion. I will answer all letters.

Dan Weaver
66 Bunn St.
Amsterdam, NY 12010

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Word Power 3.2

More Versatile • More Powerful With Spooler • Calculator • Split-Screen • 2-Column Printing

> *"... friendly...amazing execution speed...much easier to use than VIP software & 2 other word processing systems I've tried...very user-friendly...massive text storage capacity ...highest among word processors..."* - **Rainbow Oct. 88 Review for Word Power**

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows**. The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in **two columns!** Create professional documents without hours of aligning text.

SPELLING CHECKER

DICTIONARY

Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to /delete words from dictionary.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & $5.00 to cover S&H costs & instructions)

MICROCOM SOFTWARE

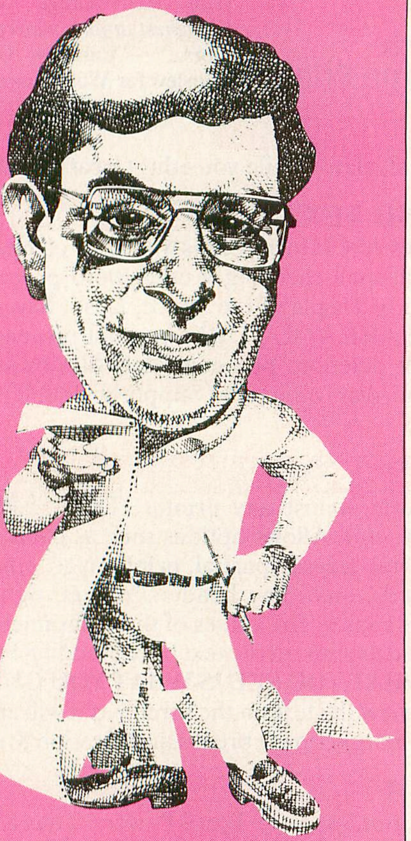
All Word Power 3.2 orders shipped by **UPS Next Day Air** at no extra charge within the Continental US. Offer good thru January 15, 1989.

To Order & for info on FREE Gifts: Refer to Page 17 of our 6-page Ad series(Pgs. 9-17)

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830

NEXT DAY AIR



Here to Stay

Las Vegas — I am pretty worn out right now. It's someone's fault, but I am not sure exactly whose fault it is. I think it is Frank Hogg's fault, but he denies responsibility. If Frank is right, which does happen on occasion, it could be Gordon Monnier's fault. Of course, I have yet to see Gordon here this time.

A fine Texas gentleman, Dick Hatcher, is really ultimately to blame. It was Dick — when he worked with a Color Computer software company called ANTECO — who lured me to this desert town for the Consumer Electronics Show about six or seven years ago. But Dick fled to Thailand. And while he is back in this country (and a renewed subscriber to RAINBOW *and* a new one to PCM), it is hard to cast the blame at his feet.

No, either Frank or Gordon talked me into coming to COMDEX for the first time.

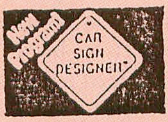
Frank denies it because he says he has never come to COMDEX, only to the now-gone and not-too-lamented National Computer Conference. But I seem to recall his egging me on to go, so I am not sure that he did not send me out as a scout one time.

Gordon, of course, has been here a lot. In fact, Falsoft and MichTron have shared booths on occasion here. Gordon sold software, and we sold magazines (although not too many of them). At least not at COMDEX.

As many of you know, COMDEX is the computer show of the year. This is the 10th annual running of this attraction, which now covers entire exhibit halls in five major hotels and the Las Vegas Convention Center. The famous West Hall of the Convention Center was built by COMDEX (so the story goes) for Las Vegas, so there would be adequate space. There are also some exhibits in something called the "Cashman Field Center," which I guess I will find before I head back to Kentucky.

Max-10™

Best Desktop Publishing / Document Creator for the CoCo 3. Features Pull Down Menus, What You See Is What You Get , UNDO, integrated text & graphics capability , multiple fonts & more. Graphics can be imported from CoCo Max I,II,III, MGE, MGF, 5 Level DS-69, PMODE 4, HSCREEN 2/3 pictures. Supports: DMP 105/130, EPSON MX/FX/RXLX/ Gemini 10 Series, CGP-220 and OKI-92. Only **$79.95**



Create distinctive bright yellow diamond shaped car signs. Includes 2 resuable clear plastic sign holders with suction cups, and 50 sheets of bright yellow fan-fold paper. Printer Requirements are the same as for the CoCo Graphics Designer. Only **$29.95**

Font Disk #1,#2 for CoCo Graphics Designer: $19.95 each

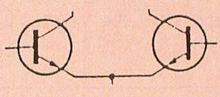
COLOR SCHEMATIC DESIGNER

By Prakash Mishra

An excellent Circuit Schematic Design Software Package for CoCo 3. Features:

*** Runs in 640x192 at 1.8 Mhz**
*** Pull Down Menus**
*** Keyboard/Mouse/Joystck Support**
*** RGB/ Composite/Monochrome Monitor Support**
*** 72 Modifiable Symbols**
*** Multiple Hi-Res Fonts**
*** Multiple UNDO Command**
*** Symbol Rotate/Line/Box Draw**
*** Supports 3 Layers of Circuits**
*** Powerful Screen Print Command for DMP/Gemini/Epson Printers**
*** Complete Documentation**

Only $39.95



RSB

A Revolutionary Program that allows you to use **Basic** Programs from **OS9!**

OS9 Level 2 is the future of the CoCo. Unfortunately, most Basic Programmers are "afraid" of using OS9 because it is completely different from Basic.

Introducing RSB from Burke & Burke. It converts RS-DOS into an OS9 "shell" and allows you to program in Basic from under OS9! You can even take advantage of the OS-9 "built-in" windows to run several BASIC programs at once! And RSB always runs at the full 2 Mhz speed of the CoCo!

If you're new to OS9 or you simply want to take advantage of the advanced features of the OS9 operating system, RSB is for you. Req. OS9 L II. Only **$39.95**

ULTRAPATCH SYSTEM

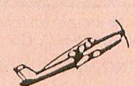
by Randall Reid

Patches the Superpatch EDTASM + ® for 80 columns, 47K Buffer (approximately 3000 lines!) & more. Req CoCo 3. Only **$19.95**

GAMES

(Disk only)
(CoCo 1,2 & 3 except where mentioned)

WARRIOR KING (CoCo 3): $29.95
IN QUEST OF STAR LORD(Animated Graphics Adventure for CoCo 3): $34.95 **Hint Sheet**: $3.95
HALL OF THE KING 1,2,3: $29.95 Each **Trilogy**: $74.95
FLIGHT 16: $34.95
P-51 MUSTANG SIMULATION: $34.95
WORLDS OF FLIGHT: $34.95
PYRAMIX(Cubix for CoCo 3): $24.95
KUNG FU DUDE: $24.95 **CHAMPION**: $19.95
WHITE FIRE OF ETERNITY: $19.95
QUEST FOR THE SPIRIT STONE (CoCo 3): $18
WARGAME DESIGNER (CoCo 3): $29
TREASURY PACK#1: Lunar Rover Patrol, Cubix, Declathon, Qix, keys of Wizard, Module Man, Pengon, & Roller Controller.Only $29.95
TREASURY PACK #2: Lancer, Ms. Gobbler, Froggie, Madness & Minotaur, Ice Castles, Galagon, Devious. Only $29.95
SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows.Only $29.95
WIZARD'S CASTLE: A hi-res graphics adventure game filled with traps, tricks, treasures. Only $19.95
CLASSIC PAK: Treasury Pack 1, 2, Space Pac & Wizards Castle: Only $59.95



XENOCOPY-PC

An amazingly versatile program that allows you to Format/Duplicate / Read/ Write disks from over 300 different computers. For example you could transfer programs between CoCo, IBM, PC-DOS, TRS-80 Model 3, TRS-80 Model 4, TRS-80 Model 100, Xerox 820, Zenith, Kaypro II, Novell , NEC DOS and much much more!! Send for FREE List. Requires an IBM Compatible with 2 drives. Disk $79.95.

512K BACKUP LIGHTNING

(From Colorventure)
The ultimate CoCo 3 disk copying utility!! Reads your master diskette once and then makes as many copies as you want. It automatically formats an unformatted disk while copying! Supports 35, 40 or 80 track drives with various step rates. A must for any disk user!! Only $19.95

PRINTER LIGHTNING

(From Colorventure)
Never wait for your printer again!! This Print Spooler allows you to print to your printer and simultaneously continue with your programming. No need to wait for those long printouts! Disk Only $19.95

BASIC FREEDOM

A Full Screen Editor for Basic Programs!! A Must for anyone who writes Basic Programs. Only $24.95

VOCAL FREEDOM

Turn your computer into a digital voice / sound recorder. Produces natural voices/ sound effects. Req. inexpensive RS Amplifier (#277-1008) & any microphone. Only $34.95

HACKER's PAC

Allows you to incorporate voices created by Vocal Freedom into your own Basic and ML programs. Only $14.95

MICROCOM SOFTWARE VISA MasterCard AMERICAN EXPRESS DISCOVER

To Order & for info on **FREE Gifts:** Refer to Page 17 of our 6-page Ad series(Pgs. 9-17) ➡

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830

UPS 2ND DAY AIR

It has always been a mammoth job covering this show. The Las Vegas Convention Center itself, which is all there was in the early stages, is so huge that it takes a couple of days to cover — as long as you don't stop to look too long at things. This makes your legs hurt, your feet ache, your arms sore from carrying literature and (worst of all) gives you Las Vegas Throat. You see, this is the desert — no sand dunes or anything, but desert nevertheless. And *desert* means dry. If you talk a lot, you dry out your throat. Some of the professional entertainers have little steam machines attached to their microphones; when they inhale, they get moisture. The closest you get to moisture at the Las Vegas Convention Center during COMDEX is the refreshment stand. And there's a line.

All this is leading up to what I was going to write about, but it would not be fair if you did not know of the terrible privation I am now going through in order to bring you this news. Ah, the woes of a correspondent on assignment!

* * *

What I was going to write about is this: When we did come to COMDEX in the early years, we used to bemoan the fact that only three or four Color Computer software companies ever exhibited anything.

There was, indeed, quite a mishmash of just about everything. As the so-called IBM Standard began to develop with the introduction of the IBM PC, however, there were fewer and fewer alternate computer systems.

About three years ago, Gordon and I were the only ones who had booths that had anything to do with the CoCo. What was interesting, however, was that out of the increasingly pin-striped, button-down crowd, we attracted a hundred or so people who did, indeed, have CoCo's.

They are with us still. Though there is no practical reason for us to have a booth here any more, it is amazing how many people you come to meet in a business over the years, even one as ever-changing as the computer business. Walking around today, getting sore feet, aching legs and the oncoming symptoms of Las Vegas Throat, I was stopped by a good dozen or so people who wanted to talk about their CoCos and THE RAINBOW.

A small ripple, you say? Yes, of course. But the truth of the matter is that you would have to be at COMDEX to see the overwhelming hold the so-called IBM Standard has on the overall computer industry (and the overwhelming amount of money you could spend on these systems).

Yet here we are. Not seeking out members of the CoCo Community, but finding them everywhere. More interesting, I really do not see, among 1700-plus exhibitors, many products that cannot be run on some version of our Color Computer. I won't even mention the cost of doing so on anything else.

In 1998, I expect to be at the 20th COMDEX and to need a power scooter to see the whole thing. I also expect there to be a thriving CoCo Community and a RAINBOW to support it.

There is something unique about the Color Computer, and I happen to think it is wonderful. I am sure you agree.

— Lonnie Falk

Real BASIC for OS9!

Only $39.95

R.S.B. is a complete, OS9-compatible version of Disk Extended Color BASIC. Burke & Burke has added new software to give you OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

R.S.B. loads and saves files using OS9's file format. The R.S.B. package includes utility programs that let you transfer BASIC programs and data files between OS9 and BASIC disks. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B.

Your BASIC programs can take full advantage of great OS9 features like hard disks, no-halt floppies, multi-tasking, and 2 MHz operation.

R.S.B. requires a CoCo 3 with at least 128K RAM, a floppy disk controller with either Tandy Disk Extended Color BASIC or DISTO CoCo 3 CDOS ROM, and Level 2 OS9.

RAINBOW CERTIFICATION SEAL

Works with all hard & floppy disk systems!

R.S.B. $39.95

Runs in 128K; 512K preferred.

1989
New Year's
Resolutions
1) Learn OS9
2) Buy a Hard Disk
3) Clean Garage

CoCo XT Facts

Answers to common questions about the CoCo XT

- A true "NO HALT" hard disk system
- Controls 1 or 2 hard drives
- Full ECC / CRC error correction
- Average access 30% faster than SASI
- Uses PC-type hard disk controllers & hard drives
- Does not use or disable interrupts
- Compatible with most RS-232 interfaces
- 20 Meg system cost: under $450
- Requires Multi-PAK or "electric" Y-cable

Hard Disk Interfaces

RAINBOW CERTIFICATION SEAL

We've sold hundreds of our affordable, high-performance hard disk interfaces to Color Computer enthusiasts worldwide!

Each includes an anodized housing, 100 page user manual, and software for use with OS9. The CoCo XT-RTC adds a battery-powered real time clock / calendar for OS9 and BASIC.

CoCo XT $69.95
CoCo XT-RTC $99.95

XT-ROM: Install XT-ROM in your hard disk controller's BIOS ROM socket. It automatically boots and reboots OS9 from your hard disk. $19.95

Buy a drive, Western Digital controller, and case from the PC dealer of your choice. Plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and install the OS9 or BASIC software. Presto!

Wild & MV Version 2.1
Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! $19.95

EZGen Version 1.04
Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too. $19.95

OS9 Utilities

HYPER-I/O

Now BASIC runs hard drives, big floppies, and more!

HYPER-I/O modifies the RS-DOS BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and RS-DOS software with hard disk interfaces (CoCo XT, DISTO, LR), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, EPROM-able HYPER-I/O V2.6 is the most versatile hard / floppy disk DOS available. *Please specify HYPER-I/O, DISTO HYPER-I/O, or LR HYPER-I/O when ordering.*

$29.95

HYPER-III (Adds RAM Disk and Print Spooler to HYPER-I/O on the CoCo 3) *$12.95*

Burke & Burke
P.O. Box 1283 Palatine, IL 60078-1283 (312) 397-2898

MasterCard VISA

ILLINOIS RESIDENTS PLEASE ADD 7% SALES TAX. COD's add $2.20. Shipping (within the USA) $2.00 per CoCo XT; $1.50 per disk or ROM.
Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted (312) 397-2898.

COCO 3 UTILITIES GALORE

(CoCo 2 Versions Included where specified)

SUPER TAPE/DISK TRANSFER

* Disk-to-Disk Copy * Tape-to-Disk Copy
* Tape-to-Disk Auto Relocate
* Disk-to-Tape Copy * Tape-to-Tape Copy
Copies Basic/ML/Data Files. CoCo 1,2 or 3. Req. min. 64K Disk System. Disk Only **$24.95**

COCO CHECKER

Something possibly wrong with your CoCo? CoCo Checker is the answer. Will test your ROMs, RAMs, Disk Drives & Controller, Printer, Keyboard, Cassette, Joysticks, Sound, PIAs, VDG, Internal Clock Speed, Multi-Pak Interface and more! Only **$24.95**

DISK UTILITY 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. Single key execution of Basic/ML programs. This will become your MOST USED program !! CoCo 1,2 or 3. Req. Min. 64K. Disk Only **$24.95**

MAILLIST PRO

The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) and print labels. Its indispensible!! Disk **$19.95** (CoCo 2 version included)

DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text. Double Strike, Border Creation, and multiple label printing. Its a MUST for any user with a disk drive. Supports DMP 105/106/110/120/ 130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included). Only **$19.95**

COCO UTIL II

COCO-DOS MS-DOS

(Latest Version): Transfer CoCo Disk files to IBM compatible computer and vica-versa. Requires 2-Drive IBM Compatible. Disk **$39.95**

RGB PATCH

Displays most games in color on RGB monitors. CoCo 3 Disk **$24.95**

COMPUTERIZED CHECKBOOK

Why bother with balancing your checkbook? Let the CoCo do it for you. Allows you to add, view, search, edit, change, delete and printout (in a table/individual entry format) checkbook entries. Updates balance after each entry. Allows files for checking, savings, and other accounts. Disk **$19.95.** (CoCo 2 version included)

BOWLING SCORE KEEPER

An excellent utility to keep track of your bowling scores. Allows you to save scores under individuals or teams. You can edit change, delete, and compare scores. A must for anyone who wants to keep track of his or her bowling performance. Disk $19.95 (CoCo 2 version included)

VCR TAPE ORGANIZER

Organize your videotapes with this program. Allows you to index tapes by title, rating, type, play time and comments. Also allows you to sort titles alphabetically & view/print selected tapes. If you own a VCR, this program is a MUST!! Disk $19.95 (CoCo 2 version included)

COCO 3 SCREEN DUMP

Fantastic

32, 40, 80 column text dump, PMODE 4 Graphics Dump. Single Keystroke Operation allows you to take snapshots of your screens even when programs are running! Works on DMP's, Epson, Gemini and compatibles. CoCo 1, 2 and 3. Disk **$24.95**

HOME BILL MANAGER

Let the CoCo keep track of your bills. Allows you to enter bills under various categories and reminds you when they are due. Disk **$19.95**

CALENDAR MAKER

Generate monthly calendars on your printer for any year in the 20th century. Disk Only **$19.95** (CoCo 2 version included)

ADOS 3

Advanced disk operating system for CoCo 3. Comes on disk and is EPROMable!! Disk **$34.95.** **ADOS** (for CoCo 1,2): **$27.95**

OS 9

Start OS9

An Enjoyable, Hands-on Guide to OS9 Level II. Includes step-by-step tutorials, articles by OS9 experts, free software disk includes examples & great OS-9 utilities! Req. 512K, OS9 Level II, 2 drives & monitor. The Hottest OS9 Package. Disk + Book: **$32.95**

The Zapper: Patch Disk Errors. $19.95

Disk Manager Tree: Change, create & delete directories quickly. Req. 512K LII. $29.95

Level II Tools : Wildcards, tree commands, windowing & 22 more utilities. 128K Req. $24.95

Warp One: Complete LII Windowing Terminal. Auto dial, macros, file transfers, capture, timer, chat, etc. 512K Req. $34.95

WIZ

Best LII Terminal Package with 300-19200 baud rate/windowing. Req. 512K & RS-232 Pack. **$79.95**

DYNASTAR

Best OS9 Editor/Word Processor. Has Macros, supports terminals & windows simultaneously, configurable, auto-indent for C/Pascal programming, mail-merge. New Manual makes it easier than ever. Only **$99.95. DynaSpell: $74.95. Both Dynastar and Dynaspell: Only $124.95**

DYNACALC Spreadsheet: **$99.95**

OS9 LEVEL II BBS Rel 2.0

BBS program that supports multiple users & sysop definable menus. Tsmon, Login, Chat, Message Retrieval, Mail Retrieval, Uloadx, Dloadx, and much more! Req. 512K. New Version! Only **$29.95**

GSC File Transfer Utilities

Now you can transfer files to & from PC (MS DOS), RSDOS/FLEX disks into your CoCo (OS9) system. Options: Single/Double sided disks, 40/80 tracks, 8/9 sectors & more! Req. OS9 (Level 2 for MultiVue version), 2 drives, SDISK/SDISK 3. Standard Version: $**44.95**; MultiVue Version: $**54.95**

PC-Xfer UTILITIES

Programs to format and transfer files to/from MS DOS diskettes on CoCo Under OS9 Level 1 and 2. Requires SDISK or SDISK 3. Only **$44.95**

SDISK 3

Standard disk drive module replacement allows full use of 40/80 track double-sided drives. Req. OS9 Level II. Only **$29.95. SDISK: $29.95**

OS9 LEVEL II RAMDISK

Lightning Fast Ramdisk. A must for any OS9 Level II user. Req 512K. Only **$29.95**

MICROCOM SOFTWARE VISA MasterCard AMERICAN EXPRESS DISCOVER

UPS 2ND DAY AIR

To Order & for info on **FREE Gifts:** Refer to Page 17 of our 6-page Ad series(Pgs. 9-17) ➡

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830

How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the *ASCII* source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

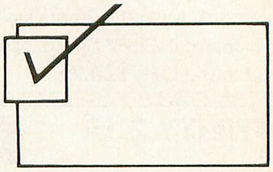
Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

The Seal is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Books That Can Launch A 1000 Programs!!

Pokes, Peeks and Execs are your guides into the jungle of computer programming. These commands give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information, with explanations and examples to help you immediately put it to use. Everyone from the novice to the professional will find these handy books a wealth of information.

300 POKES, PEEKS, 'N EXECS for COCO III

- *40/80 column Screen Text Dump
- *Save Text/Graphics Screen to Disk
- *Command/Functions Disables
- *Enhancements for CoCo3 BASIC
- *128K/512K RAM Test Program
- *HPRINT Character Modifier

Only *$19.95*

500 POKES PEEKS,'N EXECS

- *Autostart your BASIC programs
- *Disable Color BASIC/ECB/Disk BASIC commands
- *Disable Break Key/ Clear Key/ Reset Button
- *Generate a Repeat-key
- *Transfer ROMPAKs to tape
- *Set 23 different GRAPHIC modes
- *Merge two BASIC programs
- *And much much more!!!

For CoCo 1,2 and 3. Only *$16.95*

ALL 3 BOOKS for $39.95

SUPPLEMENT TO 500 POKES,PEEKS, 'N EXECS

200 additional Pokes,Peeks and Execs (500 Pokes Peeks 'N Execs is a prerequisite)

- *ROMPAK transfer to disk
- *PAINT with 65000 styles
- *Use of 40 track single/double sided drives
- *High-speed Cassette Operation
- *Telewriter, CoCo Max enhancements
- * Graphics Dump (for DMP printers) /Text Screen Dump

For CoCo 1,2 or 3. Only *$9.95*

UNRAVELLED SERIES

An invaluable aid for Basic and Machine Language programmers, these books provide a complete disassembly and annotated listing of the BASIC/ECB and Disk ROMs. These listings give complete, uninterupted memory maps of the four ROMs. Gain complete control over all versions of the color computer.

EXTENDED COLOR BASIC UNRAVELLED: COLOR BASIC and EXTENDED BASIC ROM Disassembly: **$39.95**
DISK BASIC UNRAVELLED: DISK BASIC ROM 1.1 and 1.0 Disassembly : **$19.95**
BOTH ECB AND DISK BASIC UNRAVELLED: $49.95
SUPER EXTENDED BASIC UNRAVELLED: SUPER EXTENDED BASIC ROM Disassembly for CoCo 3. **$24.95**
COMPLETE UNRAVELLED SERIES (all 3 books): $59.95

COCO LIBRARY

CoCo 3 Service Manual: **$39.95**
CoCo 2 Service Manual: **$29.95**
Inside OS9 Level II: **$39.95**
Rainbow Guide To OS9 Level II: **$19.95**
Rainbow Guide To OS9 II (disk): **$19.95**
Complete Guide To OS9 (Level 1): **$19.95**
Complete Guide To OS9 (2 Disk): **$29.95**
CoCo 3 Secrets Revealed: **$19.95**
Basic Programming Tricks: **$12.95**
Assembly Language Programming(tepco): **$18**
Addendum For CoCo3 (tepco): **$12**
Color Computer Disk Manual (with ref card): **$29.95**
Start OS-9 (Book & Disk): **$32.99**

OTHER SOFTWARE ...

COCO MAX III (with hi-res interface): **$79.95**
COCO MAX II: Disk **$77.95** Tape **$67.95**
MAXFONTS #1,.#2,#3,#4: Disk **$19.95** Each
NX1000 Rainbow Driver for CoCo Max III: $19.95
MAXPATCH: Run COCO MAX II on COCO 3. **$24.95**

EDT/ASM 64D: Editor-assembler (specify 1,2,3) **$59.95**
SOURCE: CoCo Disassembler **$34.95 SOURCE III: $49.95**
CBASIC: Best Basic compiler **$149.95 CBASIC III: $149.95**

TELEWRITER 64 (COCO 1&2) :Best Word Processor for CoCo 1 & 2. Disk **$57.95** Tape **$47.95**

AUTOTERM:Modem software Disk **$39.95** Cas **$29.95**
PRO-COLOR FILE *ENHANCED*: **$59.95**

VIP DATABASE III

Best Database for CoCo 3. Features 40/64/80 columns, size limited only by disk space, easy to understand menu system, LIGHTNING FAST in-memory sort, multiple search, built-in mail merge, built-in MATH PACKAGE, print spooler and report generator, unlimited print formats & more. **$69.95**

WINDOW MASTER

The hottest program for your CoCo 3!! Imagine using Windows, Pull-Down Menus, Buttons, Icons, Edit Field, and Mouse Functions in your Basic Programs. No need to use OS9. It uses the 640x255 (or 320x255) hires graphics mode for the highest resolution. Up to 31 windows can appear on the screen at one time. Need extra character sets? Window Master supports 5 fonts in 54 sizes! How about an enhanced Editor for Basic? It gives you a superb Basic Editor which leaves the standard EDIT command in the cold. And don't forget that many existing Basic/ML programs will operate under Window Master with little or no changes. In fact, it does NOT take up any memory from Basic. Requires 1 Disk Drive, RS Hi-res Interface & Joystick or Mouse. Includes 128K & 512K Version. **$69. 95** Window Master & Hi-Res Interface. Only **$79.95**

FKEYS III

A user friendly, user programmable function key utility that creates up to 20 function keys. Includes EDITOR, DOS mods, DISABLE, and its EPROMable! Disk **$19.95**

SIXDRIVE

Allows the use of 3 double-sided drives from RSDOS or ADOS. Only **$16.95**

MICROCOM SOFTWARE VISA MasterCard AMERICAN EXPRESS DISCOVER

To Order & for info on **FREE Gifts:** Refer to Page 17 of our 6-page Ad series(Pgs. 9-17) →

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830

UPS 2ND DAY AIR

512K BASIC

(For 128K & 512K Computers)

From the authors of Word Power 3.2, the best-selling Word Processor for CoCo 3, comes a revolutionary programming tool!

Do you have a 128K or 512K CoCo 3? Are you being told that you could only use 22K from Basic?? Don't believe it!!

Lets face it. You bought your CoCo 3 so you could get better graphics, more speed and more MEMORY. Unfortunately as it comes, the CoCo 3 only allows you to use 22K for Basic Programs. A big disappointment for Basic Programmers.

Introducing the revolutionary **512K Basic.** It gives you up to 80K Basic program/variable space (64K for Basic Program/16K for variables) on a 128K CoCo and over 400K (384K Basic Program Space & 16K Variable Space) on a 512K CoCo! There are no new commands to remember and approximately 90-95% of the existing Basic Software will run without any modifications. 512K Basic is completely transparent to the user. You won't even know its there until you realize that you were able to type in a massive Basic program without the dreaded ?OM Error. And **512K Basic** will even run at double clock-speed and automatically slow down for printer and disk operations.

Step up to **512K Basic.** It's the tool you need to tap the full potential of your CoCo 3. 512K Basic Requires a 128K or 512K CoCo 3 with a disk drive. OS9 is NOT required. Only **$39.95**

512K Upgrades for CoCo 3.

(Only $160 with purchase of 512K Basic)

Fully assembled, tested and ready to be shipped now. Comes with $100 worth of 512K Software:

- 512K Backup Lightning
- 512K Print Spooler
- 512K Memory Test
- 512K Ramdisk
- OS9 Level II Ramdisk.

No soldering. Comes with all instruction manuals. 90 day warranty. Only **$188**

0K Upgrade Board: $39.95

KEYBOARDS , ETC.

KEYBOARD EXTENSION CABLE: Move your keyboard away from the computer & type with ease. Use your existing keyboard with this cable or leave your present keyboard intact and use a second keyboard. Only **$39.95.**

Cable with CoCo 2 Keyboard: $49.95
Cable with CoCo 3 Keyboard: $69.95
CoCo 3 Keyboard (with free FUNCTION KEYS software value $14.95)**:$39.95**
CoCo 2 Keyboard: $19.95

COMMUNICATIONS EXTRAVAGANZA

1) **Avatex 1200e Modem:** Fully Hayes compatible 300/1200 w/ speaker, Auto-Dial/Answer/Redial.
2) **MODEM CABLE:** 4 pin/DB 25 (Reg. $19.95)
3)**Autoterm Software:** (Reg $39.95)
4)**FREE** Compuserve Offer & Acess Time
5) **UPS 2nd Day Air Shipping**

Only $129.95

With Avatex 2400e instead of 1200e: **$229.95**

Avatex 1200e Modem Only: $85
Avatex 2400e Modem Only: $189

EPROM

INTRONICS EPROM PROGRAMMER (for CoCo): Programs 2516-27512 & more! Includes software & complete documentation. Latest version. Lowest Price Anywhere! Only **$137.95**

EPROM ERASER: Fast erase of 24/28 pin EPROMs. Only **$49.95**

BOTH EPROM PROGRAMMER & ERASER: $179.95

EPROMS: 2764-$8 27128-$9

ROMPAK (w/ Blank PC Board 27xx Series)**: $12.95**

BLANK CARTRIDGE (Disk Controller Size)**: $10.95**

ACCESORIES

5 1/4" DS/DD Disks: **$.40** each
3 1/2" DS/DD Disks: **$1.49** each
5 1/4" Disk Case (for 70 disks): **$9.95**
3 1/2" Disk Case (for 40 disks): **$7.50**

Curtis Printer Stand: **$19.95**
Surge Supresser Strip w/ 6 outlets: **$14.95**
Curtis Static Mat: **$24.95**

RIBBONS

NX1000 Color Ribbon: **$12.95**
NX1000 Black Ribbon: **$8.50**
Seikosha, EPSON, DMP, Panasonic, Okidata, Gemini Ribbons: **$8.50** each

CABLES

MAGNAVOX 8505/8515/8CM643 Analog RGB Cable: **$24.95**

SERIAL-TO-PARALLEL INTERFACE: Use your parallel printer at high speed (300-9600 baud) with CoCo. Comes will all cables. No software compatibility problems. Only **$44.95**

15" MULTIPAK/ROMPAK EXTENDER CABLE: $29.95

VIDEO DRIVER: Use a monochrome/color monitor with your CoCo. Comes with audio/video cables. Specify CoCo 1 or 2. Excellent picture quality/resolution! **$34.95**

RS232 Y CABLE: Hook 2 Devices to the serial port. Only **$18.95**

Y CABLE: Use your disk system with Speech Pak,CoCo Max, DS69, etc. **$27.95**

RGB Analog Extender Cable:$19.95
SONY Monitor Cable: $29.95
VIDEO CLEAR: Reduce TV interference.**$19.95**
MODEM CABLE:4 pin to DB25.Only **$19.95**
3-POSITION SWITCHER: $37.95
HI-RES JOYSTICK INTERFACE: $11.99

CHIPS, ETC

Disk Basic Rom 1.1 (Needed for CoCo 3)**: $29.95** **ECB ROM 1.1:$29.95**

68B09E or 6809E Chip: $14.95

MultiPak PAL Chip for CoCo 3: **$19.95**

PAL Switcher: Now you can switch between the CoCo 2 and 3 modes when using the Multi-Pak. You need the OLDER & NEW PAL chip for the 26-3024 Multipak. Only **$39.95.** With NEW PAL Chip: **$49.95.**

UPGRADES

64K Upgrade for CoCo I's, CoCo II's with Cat #26-3026/27, 26-3134, 26-3136: **$29.95**

64K Upgrade for 26-3134 A/B CoCo II: **$39.95**

(Free 64K Software incl. with 64K Upgr.)

MICROCOM SOFTWARE VISA MasterCard AMERICAN EXPRESS DISCOVER

To Order & for info on **FREE Gifts:** Refer to Page 17 of our 6-page Ad series(Pgs. 9-17) →

UPS 2ND DAY AIR

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830

COCO 3

CoCo 3 Combo Package

- 128K Color Computer 3
- 500 Pokes Peeks 'n Execs Book
- CoCo 3 Secrets Revealed Book
- Basic Programming Tricks Book
- Utility Routines Volume 1 Book
- $10 off our Drive 0 system

CoCo 3 Combo Package: $169 (Please add $8 S&H in US/$20 in Canada)

MULTIPAKS

Allows you to hook up 4 rompaks/controllers/RS232 Pack, etc. Needed for most hard drive systems.

Multipak (26-3124) for CoCo 2: **$89**
Multipak (26-3124) upgraded for CoCo 3: **$99**

We have limited quantities of these hard-to-find multipaks. Order yours today.
MPI Locking Plate (Specify Cat #): $8

MAGNAVOX 8CM515 RGB MONITOR

Razor-sharp picture quality for your CoCo! Has 14" screen, Analog/TTL RGB, Composite Inputs for CoCo 2/3, Speaker, tilt-stand & 2 year warranty! Only **$265** (add $12 S&H/$40 in Canada)

Magnavox RGB Cable for CoCo 3 and Composite Video / Audio Cable Set with purchase of monitor: **$19.95**

DISK DRIVES for CoCo 2 & 3

There are a lot of dealers selling disk drives for the CoCo. Why buy from us? **First**, all our drives are Brand New and made by Fujitsu. They are sleek, quiet and have a reputation of superb reliability. **Second**, our Drive 0 systems come with the acclaimed DISTO Controller - with gold-plated contacts. **Third**, our Drive 0 systems come with the official 200 page Radio Shack Disk Manual with floppy disks; everything you need to get started. **Fourth**, you get $60 worth of our utility software (Disk Util 2.1A & Super Tape/Disk Transfer) & our DISKMAX software which allows you to acess BOTH sides of our drives. Our drive systems are head & shoulders above the rest.

Drive 0 (With Disto Controller, Case, Power Supply, 1 Drive Cable, Manual, Software): **$209**
Drive 1 (With Case, Power Supply & software): **$129** Bare 5 1/4" Drive: **$89**
2 Drive System (With Disto Controller, Case, Power Supply, 2 Drive Cable, Manual & Software): **$309**
1 Drive Cable: **$16.95** 2 Drive Cable: $ **22.95** 4 Drive Cable:$ **34.95**

HARD DRIVE SYSTEMS/ INTERFACES

Complete w/ Hard Drive, Western Digital Controller, B&B Interface, Cables, Case, Power Supply, Software (HYPER IO) & Instruction manuals. Assembled/tested/formatted. Just *Plug'N'Run.* This is **the best** hard drive deal for the CoCo.

Seagate 20 Meg System: $509
Seagate 30 Meg System: $539

CoCo XT: Use 2 5-120 Meg Drives with your CoCo. Only **$69.95** w/ Real Time Clock: **$99.95**
CoCo XT ROM: Boots OS9 from hard/floppy. **$19.95**
HYPERIO: Allows Hard Drive Use with RSDOS. Only **$29.95** **HYPERIO: Disto Version:** If you have a DISTO Controller w/ Hard Drive Interface, this program will allow you to use your Hard Drive from RSDOS!! Only **$29.95**

PRINTERS

All our Printer Systems include Serial-to-Parallel Interface.

NX1000 Rainbow System: NX1000 Color Printer w/144 CPS draft • Friction/Tractor Feed • Epson/IBM Compatible • 1 Year Warranty. Only **$289**

NX1000 System: NX1000 Printer w/ 144 cps Draft • Friction/Tractor Feed • Epson/IBM Compatible • 1 Year Warranty. Only **$199**

Panasonic KX-P1080i II System: Panasonic Printer w/ 144 cps Draft • Tractor/Friction Feed • Epson/IBM Compatible • 2 Year Warranty. Only **$189**

Panasonic KX-1592 System: Panasonic Printer w/216 cps Draft • 16.5" Wide Carriage • 2 Year Warranty: **$399**

DISTO PRODUCTS ...

Disto Super Controller: $79.95 **Disto Super Controller II: $129.95**

- Mini Eprom Programmer Add on: **$54.95**
- Hard Disk Add On: **$49.95**
- RT Clock & Parallel Interface: **$39.95**
- MEB Adapter Add On: **$24.95**

MULTI-BOARD ADAPTER: Printer Port, Faster RT Clock & true RS-232 Serial Port. **$59.95**

RS232 SUPER PACK: Here it is! True RS-232 Port for your CoCo. Compatible with Tandy® Deluxe RS232 Pack. Includes DB25 Cable. Requires Multipak. **Only $54.95**

VISA MasterCard AMERICAN EXPRESS DISCOVER

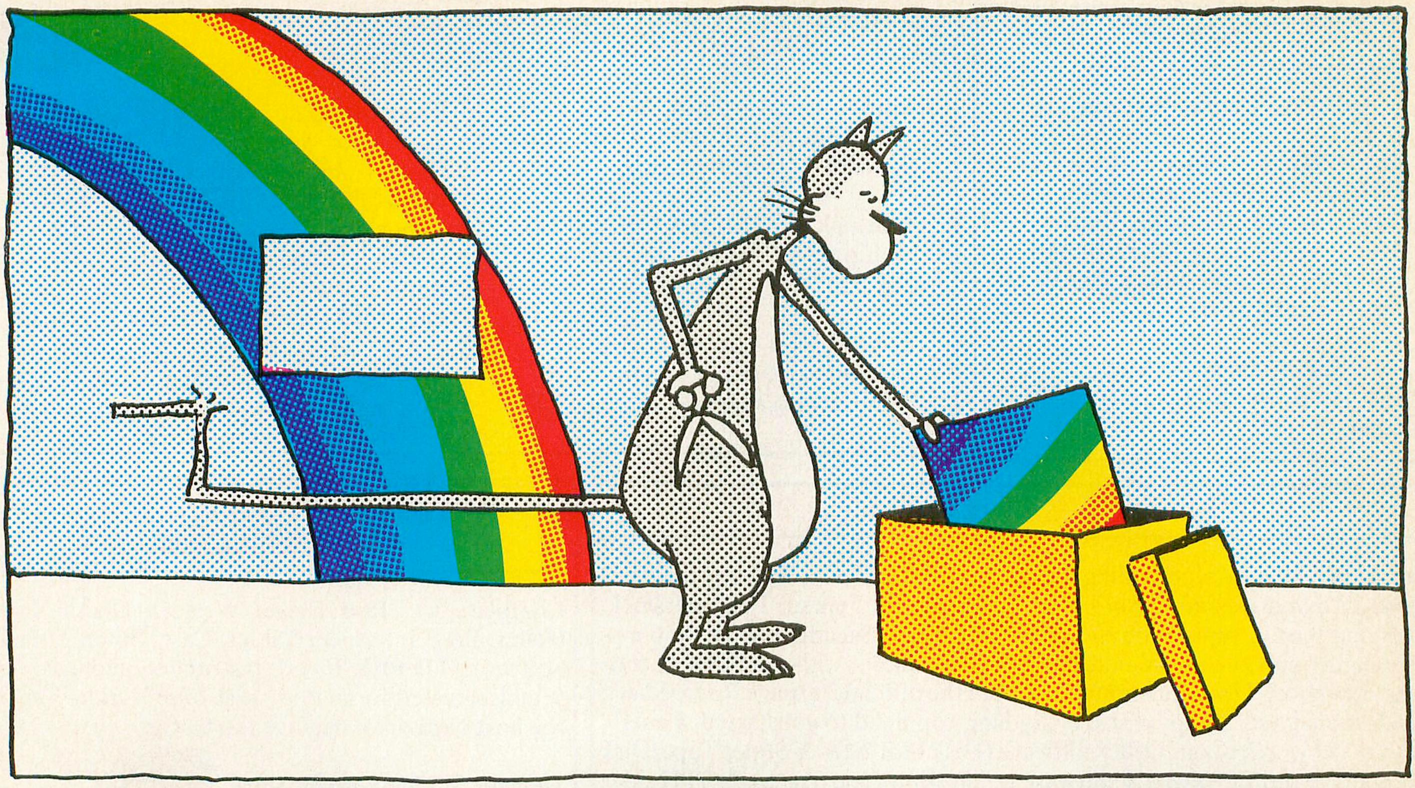
MICROCOM SOFTWARE 2900 Monroe Avenue • Rochester, NY 14618

To Order: All orders $50 & above (except Printers, Monitors, Drives, Computers) shipped by **UPS 2nd Day Air** in the Continental US. We accept Visa,MC, Amex,Discover,Check & MO. **FREE GIFTS:** All Orders **$99 & above** also recieve a **FREE 1989 Diary** & **X-MAS Card.** Please add $3.00 for S&H (Drives/Printers add $10 S&H); foreign add 10% S&H (min $5). NYS Residents add sales tax. Our Australian Agent: Aust. Peripheral Development Ph:**07-208-7820**

Credit Card Toll Free Order line 1-800-654-5244 (9am-8pm 7 days/week)

UPS 2ND DAY AIR

Order Status, Info, Technical Info: (716) 383-8830. **FAX**: 716-383-0026



HOW DO YOU GIVE A RAINBOW?

It's simple — Give a RAINBOW gift certificate . . .

Let a gift subscription to THE RAINBOW carry the premier Color Computer magazine right to your friend's doorsteps. THE RAINBOW is *the* information source for the Tandy Color Computer.

Each month, your friends will enjoy the intelligent programs, reviews and articles written exclusively for their CoCo.

First, your gift will be announced in a handsome card. Then, all year 'round, they'll remember you and your thoughtfulness when they get each edition of THE RAINBOW — pages loaded with delightful programs, regular columns and plenty of helpful hints and tips.

Generosity benefits the giver, too. There'll be no more tracking down borrowed copies of THE RAINBOW. Your collection will be safe at home.

Give a RAINBOW gift certificate and let your friends in on the fun. THE RAINBOW *is* the perfect companion for the Color Computer!

Get your order to us by February 25 and we'll begin your friends' subscriptions with the April issue of RAINBOW.

Please begin a one-year (12 issues) gift subscription to THE RAINBOW for:

Name ______________________________

Address ______________________________

City ______________State __________ ZIP __________

From:

Name ______________________________

Address ______________________________

City ______________State __________ ZIP __________

☐ My payment is enclosed.

Bill to: ☐ VISA ☐ MasterCard ☐ American Express

Acct. # ____________________Exp. date ________

Signature ______________________________

Mail to:
Rainbow Gift Certificate, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST.
All other inquiries call (502) 228-4492.

Subscriptions to THE RAINBOW are $31 in the United States; U.S. $38 in Canada. The surface rate to other countries is U.S. $68; the air rate, U.S. $103. Kentucky residents add 5% sales tax. **U.S. currency *only*, please.** All subscriptions begin with the current issue. Please allow 6 to 8 weeks for delivery. In order to hold down non-editorial costs, we do not bill.

COLORWARE Introduces

THE WORKS

"Your CoCo 3 will think it's a Mac."

GRAPHIC DESIGN / WORD PROCESSING / SPELLCHECKER

The Ultimate in Desktop Publishing

The Works includes everything below

All for $149.95

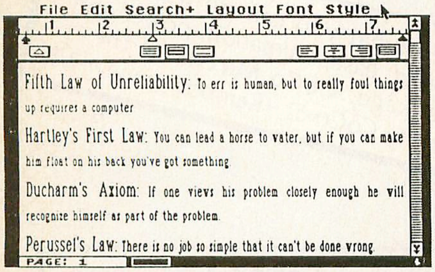
Save $80.00

Max-10+

Now with online 40,000 word spellchecker

Regularly $79.95

The latest in CoCo word processors and the only one with true WYSIWYG (What You See Is What You Get) output. Mix graphics with text. Max-10 is great for anything from greeting cards up to newsletters. Just turn the next page for a full list of Max-10's unbelievable features.



Fifth Law of Unreliability: To err is human, but to really foul things up requires a computer

Hartley's First Law: You can lead a horse to vater, but if you can make him float on his back you've got something

Ducharm's Axiom: If one views his problem closely enough he vill recognize himself as part of the problem.

Perussel's Law: There is no job so simple that it can't be done vrong

Max-10 Font Set

Regularly $29.95

36 fonts on 2 disks. Can all be used easily and quickly with Max-10.

Frontier 18 point
Athens 18 point
Irvine 12 point
Irvine 24
Swan Song 12 point
Swan Song 24
Ellesmere 12 point
Ellesmere 24 point
Ellesmere Bold 24
Digital 12 point

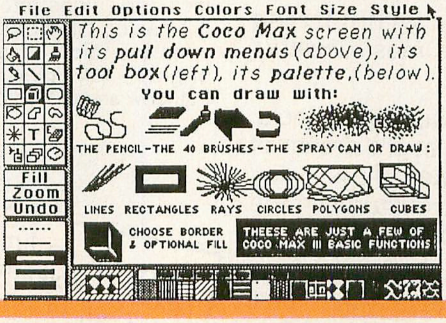
Longhand 24
Hollow 12 point
Hollow 18 point
Rome 9 point
Rome 12 point
Stencil 18 point
Futura 24
Courier 12 point
Brookhaven 18
Thames 18 point
San Francisco 18
Century 24

All these and 14 more!

CoCo Max III

Regularly $79.95

The ultimate graphics creation program. See the list of features on the next page. Also read the superb review in **The Rainbow**, *April 1988*.


File Edit Options Colors Font Size Style
Fill
Zoom
Undo
THE PENCIL-THE 40 BRUSHES-THE SPRAY CAN OR DRAW:
LINES
RECTANGLES
RAYS
CIRCLES
POLYGONS
CUBES
CHOOSE BORDER & OPTIONAL FILL

This is the Coco Max screen with its pull down menus (above), its tool box (left), its palette, (below).

You can draw with:

THEESE ARE JUST A FEW OF COCO MAX III BASIC FUNCTIONS

CoCo Max Fonts

Regularly $49.95

Almost 100 fonts for incredible headlines and text. Four disks full of fonts. Use CoCo Max styles (Bold, Italic, 3-D, Shadow ...), sizing and colors for absolutely wonderful effects. Thousands of combinations are possible. Here are some of the fonts:

BLOCK UP
Harlow
Koloss
maharajah
[illegible]
Peignot Small
Peignot Large
PROGRAM SMALL
PROGRAM MEDIUM
PROGRAM LARGE
[illegible]
Futura Black Small
FUTURA BLK. LG
[illegible]
[illegible]
LIQUID CRYSTAL
Моспоя Смелл
Моспоя Ларге
ORBIT
POINT OUT
Printout Small
PRINTOUT LARGE

Digital Small
Digital Medium
Digital Large
Futura
Grid Small
GRID LARGE
HAIFA
[illegible]
[illegible]
[illegible]
TABLEAU
Victory
Baby Teeth Small
BABY TEETH LG.
BOBO BOLD
[illegible]
Cartwheel
Fine Print
Normande Small
Normande Medium
NORMANDE LG.
Plano
SINALOA
sukiyaki

30 DAY TRIAL OFFER AND OUR NO-RISK GUARANTEE

We understand perfectly that you have no reason to believe anything you read. Including this ad. (Or the rave reviews)

So we invite you to evaluate **The Works** yourself. Call and order it. We'll send it with detailed, clear instructions. Use it with your own CoCo 3, on your own work, for 30 days. Try it for brilliant presentation graphics, outstanding word processing. Wring it out.

After 30 days, if it isn't for you, for any reason, we'll take it back and write you a check immediately for your full purchase price.

The risk is all ours. But we urge you not to wait, this deal may end soon. We can guarantee this price only if you order now.

Call today. You have nothing to lose.

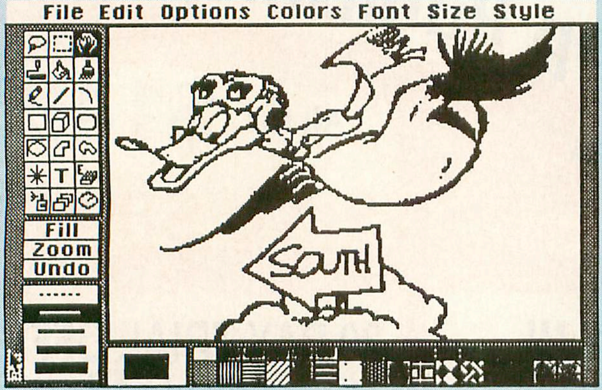
(203) 348-9436

Order line open weekdays 9 to 5 Eastern time
See next page for more ordering info.

COLORWARE
A division of Sigma Industries, Inc.

NEW REAL DESKTOP

CoCo Max™ III AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. **CoCo Max III** includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with **CoCo Max III**. Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with **CoCo Max?**

Thousands of CoCo users have found that you don't have to be an artist to have fun with **CoCo Max**. You'll wonder why you waited so long to get the incredible **CoCo Max III**.

CoCo Max III is the best because it includes:
- a huge picture area (*two* full hi-res 320x192 screens) - a large editing window - Zoom mode for detail work - 28 drawing tools which you just point and click on - shrink and stretch - rotation at any angle (1.5 degree steps) - 512K memory support (*all* features work with 128K too) - an Undo feature to correct mistakes - you can even Undo an "Undo" - Animation - special effects - color sequencing (8 colors, variable speed) - thirteen fonts (more available) - each font has eight different sizes - five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities. - the CoCo Show "slide show" program - color editing of patterns - automatic pattern alignment - prints in single and double size - smart lasso (move text over a background...) - advanced tools: arc, ray, cube, etc. - select 16 of the 64 colors (all 64 colors are displayed at once for selection!) - picture converter (CoCo Max II, MGE, BASIC) - extensive prompting - "glyphic" clipbook of rubber stamps - double click shortcuts - color mixing (additive/subtractive/none) - money back guarantee - sophisticated data compression saves disk space - pull down menus (no commands to remember) - forty paintbrush shapes - two color lettering - spray can - scrapbooks of pictures - error free - Y-cable or multipack not required - high speed hi-res interface included (plugs into joystick port) - disk is not copy protected - amazing "flowbrush" - RGB and composite monitor support - replace color - printing on black and white printers in five shades of gray - full color printing with optional drivers for the NX-1000 Rainbow and CGP220 - entirely rewritten for the CoCo 3

> There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. **CoCo Max III** is the ultimate program for the CoCo 3. -Rainbow review 4/88

CoCo Max III: $79.95
Max-10 owners: deduct $10

System Requirements:
CoCo 3 disk system and a Joystick or Mouse

Printer drivers included: IBM/Epson and compatibles, GEMINI, DMP105/106/130,OKI182/192, CGP220 (B&W), DMP110, DMP200

Color printer drivers (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **$19.95**

For all CoCo Max Versions

Max Edit Font Editor: A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **$19.95**

Max Font disks (send for list) each **$19.95**

Max Font Set (95 fonts on 4 disks) **$49.95**

DS69/69B Digitizers: allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

DS-69 (2 images per second. Requires multipak) **$99.95**

DS-69B (8 images/second) **$149.95**

CoCo 1 & 2 Owners Still Available:
(See previous ads or write for information)

CoCo Max II (works on all disk CoCos) **$69.95**

CoCo Max Tape (CoCo 1 & 2 only) **$59.95**

Y-Cable **$24.95**

CoCo Max II Picture Disk Set
set of 3 disks: **$29.95**

Guaranteed Satisfaction
Use CoCo Max or Max-10 for a full month.
If you are not delighted with either of them,
we will refund every penny.

COLORWARE
A division of Sigma Industries, Inc.

TO ORDER
(203) 656-1806 MON-FRI 9 to 5 EST
Visa or Mastercard accepted. C.O.D. orders $3 extra
Check or M.O. to: Colorware, 242-W West Ave, Darien CT 06820
Add $3 per order for shipping ($5 to Canada, 10% to overseas)
CT residents add 7.5% sales tax

PUBLISHING

COLORWARE

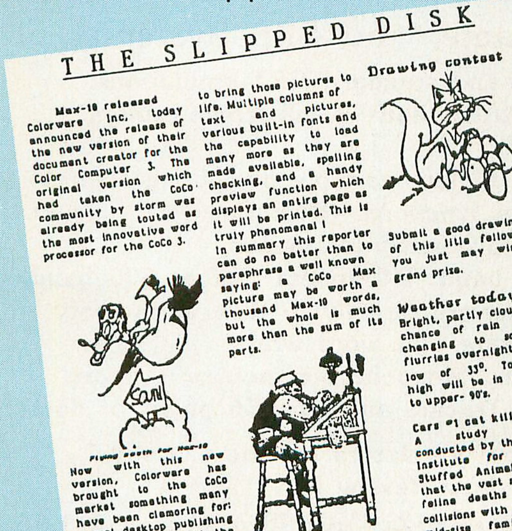
Max-10™

THE DAZZLING WORD PROCESSOR

You probably already have a word processor, and you probably wish it had these features:

- Fully menu driven (CoCo Max style) with point and click marking of text. You don't need the arrow keys!
- True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- Can print multiple columns on a page.
- Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. **Max-10** is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



THE SLIPPED DISK

Max-10 released
Colorware Inc. today announced the release of their the new version of document creator for the Color Computer 3. The original version which had taken the CoCo community by storm was already being touted as the most innovative word processor for the CoCo 3.

Flying south for Max-10

Now with this new version, Colorware has brought to the CoCo market something many have been clamoring for: a real desktop publishing system. Coupled with the already sensational CoCo Max III color graphic creator and editor, the new Max-10 can add words to bring those pictures to life. Multiple columns of text and pictures, various built-in fonts and the capability to load many more as they are made available, spelling checking, and a handy preview function which displays an entire page as it will be printed. This is truly phenomenal!

In summary this reporter can do no better than to paraphrase a well known CoCo Max saying: a picture may be worth a thousand Max-10 words, but the whole is much more than the sum of its parts.

Author Dave Stamps at work

Drawing contest

Submit a good drawing of this litle fellow and you just may win our grand prize.

Weather today
Bright, partly cloudy, 20% chance of rain possibly changing to scattered flurries overnight with a low of 33°. Tomorrow's high will be in the mid- to upper- 90's.

Cars #1 cat killers
A study recently conducted by the Rainbow Institute for Deranged Stuffed Animals reveals that the vast majority of feline deaths is due to collisions with heavy mid-size family sedans. No information was made

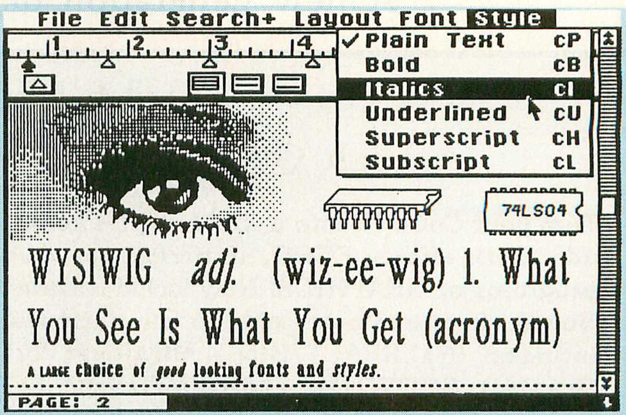
PAGE 1

Max-10: $79.95

CoCo Max III owners: deduct $10

Max-10 requires a CoCo 3, at least 1 disk, & joystick or mouse

Printer drivers included: IBM/Epson and compatibles; DMP 105, DMP106, DMP130; CGP220 (B&W); Gemini/Star



WYSIWIG *adj.* (wiz-ee-wig) 1. What You See Is What You Get (acronym)

A LARGE choice of *good* looking fonts and *styles*.

Some of the many features of **Max-10:**
- Blinding speed - printing in multiple columns - online dictionary - spell checking - graphics can be mixed with text - full justification of proportionally sized characters - bold, italic, underline superscript and subscript type styles - superb file support, just point and click - "Undo" lets you correct mistakes - easy to use, no commands to remember - any graphics program can be used - pictures can be shrunk or stretched to fit - right and left alignment - centering - variable line spacing - page numbering - current page number displayed on the screen - variable tab stops - left and right margins - tabs and margins can vary in the same document - cut and paste text and graphics anywhere in the file - page break shows on the screen - pull down menus are quick and simple to use - lightning fast access to any point in the document with the scroll box - twenty fonts (styles and sizes), more available - any number of character sizes and styles can be mixed on the same line - up to more than 120 characters per line, depending on font size, style and letters - headers and footers, even with graphics - file compatibility with other word processors - right, left, bottom and top margins - word wrap - set starting page - type ahead - key repeat - key click - scroll up and down - ASCII file output for compatibility - disk directory - kill files- block cut, copy and move - global search and replace - paragraph indent - clipboard - merge - show file (on disk) - free memory display - page count - paragraph count - word count - graphics can be resized and moved - multiple fonts - error recovery - true lowercase - 512K memory support (all features work with 128K too) - complete point and click cursor control - moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block - onscreen ruler - preview file before loading - search and replace - disk is not copy protected - more than 35 pages of text

CoCo Max III and Max-10 Perfect Together

You do not *need* **CoCo Max III** to insert and print graphics in **Max-10**. Max-10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not *need* **Max-10** to create graphics with text in **CoCo Max III**. There are tremendous lettering capabilities in **CoCo Max III**, with its many fonts, styles, and sizes.

Together **Max-10** and **CoCo Max III** are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

VISA

<<< GIMMESOFT >>>

MasterCard

A new generation of Color Computer products

MAXSOUND

RAINBOW CERTIFICATION SEAL

A High Quality Digital Audio Sampler and Sequencer

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Easily add exotic effects, ECHO, stuttering, speed shifting, sequencing, and reverse audio to BASIC or ML programs or GRAPHICS! Now includes Data Compression. Imagine recording any Voice, Music, or Sound effect and being able to use these DIGITAL recordings in your own programs! 3 disk sides includes: INTERFACT/BIN - ML driver for sound effects. G&M/BAS - Adds sound effects to Graphics. SHOWTIME and DEMO disks. SCOPE/BAS - Turns CRT into a Digital Oscilloscope to look at MAXSOUND waveforms. Version 3.0 upgrade (Includes improved ECHO and the ability to print NAMETAGS and locations to the screen and/or printer) .... $6.95 + Shipping & Handling

"*Maxsound*...bringing a new era to the CoCo Community"
-Cray Augsburg, June '88 Rainbow Review

CALL TO HEAR 'OVER THE PHONE' DEMO (128k or 512k CoCo III only) DISK $59.95

Maxsound Soundtracks & Graphics

These exciting disks are samples of what can be created with MAXSOUND and CoCo Max III! These unbelievable soundstracks w/graphics DO NOT require the MAXSOUND program to run.

NEW

Airwolf	128k.....$5.95	War of the Worlds	512k.....$5.95
Knight Rider	128k.....$5.95	Warrior King Demo	512k.....$5.95
Startrek	128k.....$5.95	Probe	512k.....$5.95

5 in 1 Demo (Airwolf, Startrek, Knight Rider, Probe, Other World) 512k.....$9.95

V-Term Terminal Emulator

RAINBOW CERTIFICATION SEAL

Communicate with VAX, UNIX, Mainframe, and BBS Systems!

- **-VT-100, VT-52, Vidtex (includes RLE graphics display), and standard CRT emulations.**
- **-Developed and tested on a UNIX system using the EMACS and VI full-screen editors.**
- **-All 128 ASCII characters accessible from the keyboard.**
- **-Uses a high-resolution graphics screen to implement a highly readable 80-column screen.**
- **-Menus can be operated concurrently with other terminal functions. (Disk Basic!)**
- **-Full 28 line by 80 column screen, with 3 bottom lines protected for menus.**
- **-Serial port up to 2400 baud, RS-232 Pak up to 9600 baud, DCModem Pak at 300 baud.**
- **-XModem, XModem-CRC, Y-Modem, and ASCII file transfers directly to disk or memory.**
- **-Prints disk or buffer files with settable margins, baud rate and word wrap.**
- **-Full 128k or 512k support with a RAMDISK like buffer. Monochrome monitor support.**
- **-Capture buffer, Snapshot, Conference mode, 35/40/80 Tracks, and over 56 pages of docs!**

"...one of the most versatile and full featured terminal emulators for the CoCo 3."
-Bryan Gridley, November '88 Rainbow Review

Version 02.00.00 upgrade ...... $6.95 + S&H Disk (128k or 512k CoCo III only) $39.95

Toll Free 1-800-441-GIME Order Line

Technical assistance: 7pm to 9pm
Orders: 9am to 9pm Eastern time
On-line orders and up to date
information: Delphi's CoCo Sig

GIMMESOFT
P.O. Box 421
Perry Hall, MD 21128
301-256-7558 or 301-256-2953

Add $3.00 for shipping and handling
Add $2.50 for COD (USA only)
MD residents add 5% sales tax
VISA/MC/Check/Money Order/COD

VISA

<<< GIMMESOFT >>>

MasterCard

A new generation of Color Computer products

NEW **TelePak +** (CoCo I/II/III) **A TRULY COMPATIBLE RS-232 INTERFACE!**

Now, from Orion Technologies, comes the answer to the continuing demand for an RS-232 interface. No compatibility hassles! Uses standard DB25 cable. Compatible with RS-DOS & OS-9 software. Baud rates up to 19,200! Enhances the Multi-tasking capabilities of the V-Term Terminal Emulator found on the opposite page. Only $49.95

CoCo Max III (CoCo III only)
THE BEST Graphics Package
See April '88 review. Disk ... $74.95

BOTH
$129.95

MAX-10 (CoCo III only)
THE DAZZLING Desktop Publisher
CM3 owners -$10 Disk ... $74.95

GRAPHICS-25 (512k CoCo III only) **Great with MAXSOUND and/or CoCo Max III!** Up to 25 ONBOARD HIRES SCREENS! Six new BASIC commands. Fast & Smooth Graphics animation. Save and Load graphics screens to and from disk. See September 1988 Rainbow review. Disk .. $19.95

MULTI-LABEL III (CoCo III only) See July '87 review. An easy to use, versatile label creating program including many new CoCo III features. Print multiple fonts on each label! This one's a MUST for the CoCo III!! Disk $16.95

FKEYS III (CoCo I/II/III) See April '87 review. A user friendly, programmable function key utility that creates up to 20 function keys. EDITOR, DOS mods, Single or Double sided, 35/40 tracks, DISABLE, and it's EPROMable!. Disk .. $19.95

SIXDRIVE (CoCo I/II/III) This machine language utility modifies DECB 1.0, 1.1, FKEYS III, or ADOS to allow the use of 3 double-sided drives (or 2 D/S drives and **J&R's RAMDISKS**) as 6 S/S drives. Disk $16.95

AUTO DIM (CoCo III only) See Jan. '88 review. This hardware device protects your monitor, or TV from IMAGE BURN after a few minutes of inactivity from your keyboard. Illustrated and easy to install. Hardware $29.95

MPI-CoCo Locking Plate (CoCo III only) See Sept '88 review. Protects your CoCo III and Multi Pak Interface from destroying each other! Please specify MPI number 26-3024 or 26-3124 when ordering! SALE $7.95

NEW **Warrior King** (CoCo III only) Become Rastann, Warrior King, on the quest to regain his rightful crown hidden deep within a sinister land. Battle monsters, gain magic & weapons, and travel thru harsh wilderness & dark castle dungeons in this medieval realm. From the creator of Kung-Fu Dude comes this awesome arcade game for the CoCo III! Uses the most detailed 320 x 200 16 color graphics & high speed ML code to vault you into a world of fantasy! Dare ye challange the many perils ahead to become Warrior King? Requires 128k CoCo III, Disk drive, and Joystick $29.95

HALL OF THE KING TRILOGY (CoCo I/II/III) See December 1988 Rainbow review. The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available. A total of 6 DISK SIDES of intense graphics adventure will have you playing for weeks! Each section is a 2 disk stand alone adventure, but all 3 together form an epic saga! Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for only $29.95, the lowest price ever, or you can SAVE and purchase the entire set for only $74.95. Requires 64k, Disk drive, (and composite monitor for the CoCo III). Please specify HALL of the King I, II, or III .... $29.95 each or the entire 6 DISK Trilogy for only $74.95

In Quest of the Star Lord (CoCo III only) See Aug '88 review. This is **THE** graphics adventure for the CoCo III! Unparalleled 320 x 200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. Full **4 Disk sides** of mind-numbing adventure! Requires 128k CoCo III and Disk drive. **HINT SHEET** .... $3.95 (+ $1.00 S&H by itself) Disk $34.95

KUNG-FU DUDE (CoCo I/II/III) See Feb. '88 review. An exciting arcade game. The **BEST** karate game ever for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective! Spectacular graphics, sound effects, and animation! Requires 64k, Disk drive, and Joystick. Now displays color on CM8. Disk $24.95

PYRAMIX (CoCo III only) See Dec. '87 review. Brilliant colors, sharp graphics, and hot action in this 100% ML arcade game. You'll enjoy hopping Kubix around the pyramid, avoiding Kaderf, Smack, Smuck, & the Death Square! Disk .. $19.95

NEW **AD&D Character's Companion** (CoCo I/II/III) This great timesaving utility helps create compatible AD&D characters. Includes dice rolling routine, pick ability, race & class. Buy from the Players Handbook, magic items & spell materials. Save, load, and print character info. 3 Disk sides $24.95

White Fire of Eternity (CoCo I/II/III) See Dec '86 review. Enter the era of monsters & magic. Search for the legendary power of White Fire throughout the Forbidden Wood & Dark Caverns in this 64k animated adventure! Disk..$19.95

Champion (CoCo I/II/III) See May '87 review. Become a superhero in this action adventure! Disk..$19.95

Dragon Blade (CoCo I/II/III) See Nov '86 review. Slay evil dragon in this 64k animated adventure! Disk..$19.95

The excitement continues!

The Fourth Rainbow Book of Adventures

Fourteen *fascinating* new Adventures from the winners of our fourth Adventure competition. Rely on your wits to escape a hostile military installation, try to stop the Nazi plan to invade Great Britain, or manage to reinstate our defense system before the enemy launches a massive missile attack — and that's only the beginning!

The Park of Mystery — You overhear a gang of robbers discussing where they've hidden their loot. Can you find it — and battle greed and confusion at the same time?

Superspy — You awaken from a horrifying nightmare of chases, inexplicable scenery changes and sickening freefalls into space. Or was it a dream? You be the judge — and determine your own fate!

Term Paper — A *real* nightmare: Someone's stolen your freshman midterm paper and hidden its pages all over CoCo State's campus. Are you smart enough to find them before you miss the due date and flunk the course?

House Adventure — Try to find your way out of a mysterious abandoned house that keeps sprouting new rooms just as you think you've found an exit.

Life: An Everyday Adventure — Just getting up in the morning in time to do last-minute chores before catching a plane to a family reunion proves you don't have to leave home to find adventure.

The Earth's Foundations — A mysterious maze inside a deep crevice near your village is having a devastating effect on the entire area. You've been chosen to investigate, and promised great riches — *if* you survive!

Experience other traditional and contemporary challenges from these winning authors: Mike Anderson, Tio Babich, David Bartmess, Stephen Berry, Eugene Carver, Charles Farris, Jeff Hillison, Jeff Johnson, Richard Kottke, Ken Lie, Andre Needham, Fred Provoncha, Paul Ruby Jr. and Eric Santanen.

The Fourth Rainbow Book of Adventures is only $10.95!

Tape $9.95, Two-Disk Set $14.95

The tape and disks are adjuncts and complements to the book; the book is necessary for introductory material and loading instructions.

Please send me:

The Fourth Rainbow Book of Adventures $10.95* ______

The Fourth Rainbow Adventures Tape $9.95 ______

The Fourth Rainbow Adventures Disk Set $14.95 ______

Name ______

Address ______

City ______ State ______ ZIP ______

☐ My check in the amount of ______ is enclosed*

Please charge to my: ☐ VISA ☐ MasterCard ☐ American Express

Acct. No. ______

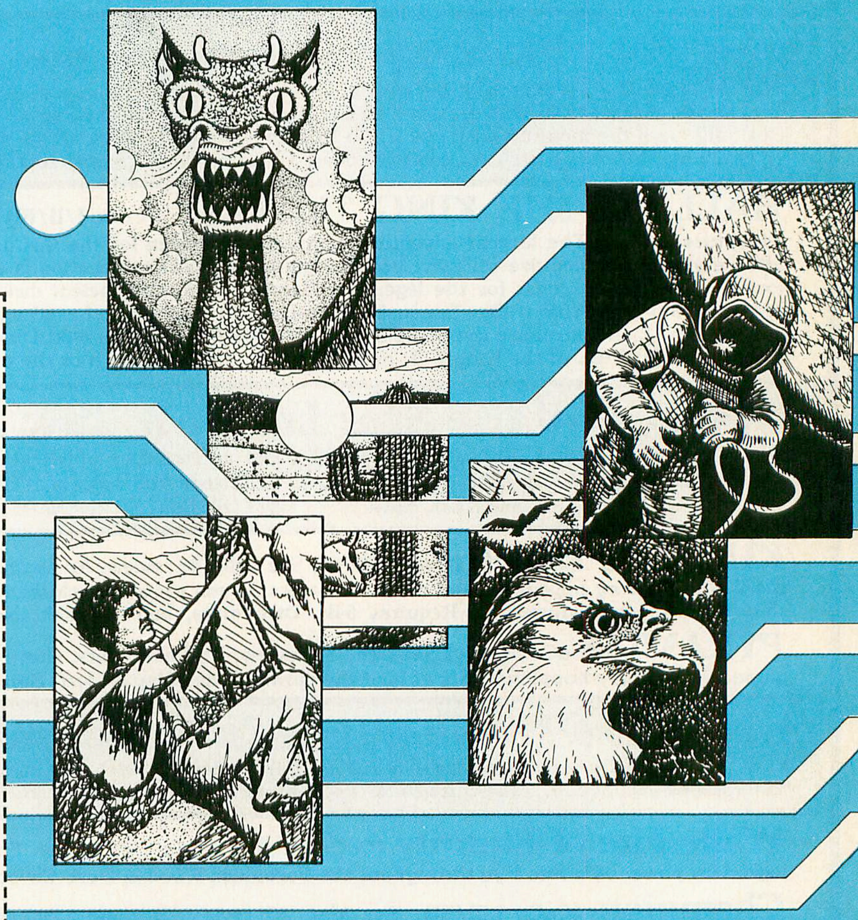
Exp. Date ______

Signature ______

Mail to: The Fourth Rainbow Book of Adventures, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

*Add $2.00 per book for shipping and handling in the U.S. Outside the U.S. add $4 per book (U.S. currency only). Kentucky residents add 5% sales tax. In order to hold down costs, we do not bill. Please allow 6-8 weeks for delivery.

To order by phone (credit card orders only), call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries, call (502) 228-4492.



VIP Writer III 2.0

495K Total Text Space • EASY 4 Color MENUS

*"In the beginning there was **VIP Writer** and users saw that it was good, But it's not the best anymore. There's a new word processor to claim the crown...**VIP Writer III** –Setting the Standard"* **–RAINBOW Sept. 1988**

MORE SCREEN DISPLAY OPTIONS

VIP Writer III offers screen widths of 32, 40, 64 & 80 - all with 24 lines and actual lower case letters using the CoCo 3's hardware display. It runs at double clock speed and has 4-color menus making VIP Writer III FAST and EASY to use! You can choose foreground, background, hilite and cursor colors from up to 64 hues. Color can be turned ON or OFF for the best possible display using a monochrome monitor or TV set. VIP Writer III has a context sensitive help facility to display command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

MORE TOTAL TEXT STORAGE

VIP Writer III has 106K total text storage in a 128K CoCo 3 (495K in 512K). VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

POWERFUL EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

AUTOMATIC TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE !

PREVIEW PRINT FORMAT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

PRINTING VERSATILITY

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

BUILT IN PRINT SPOOLING

VIP Writer III has a print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job! Some word processors DO NOT include this feature!

50,000 WORD SPELLING CHECKER

VIP Writer III includes VIP Speller (not FREEWARE) to check your text for misspelled words It has a 50,000 (not 20,000) word dictionary that can be added to or edited.

QUALITY DOCUMENTATION

VIP Writer III comes with a well written 125 page manual which is Laser printed, not dot-matrix like the competition. It includes a tutorial, glossary of terms and examples for the beginner as well as a complete index! VIP Writer III is truly the BEST you can buy.

VIP Writer III includes VIP Speller 1.1. **DISK $79.95**

Available through Radio Shack Express Order Cat. #900-0908

VIP Writer owners: Upgrade to the VIP Writer III 2.0 for $49.95 + $3 S/H. Send ORIGINAL disk and $52.95 total.

VIP Database III

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator which uses print forms you create. **DISK $69.95**

Available through Radio Shack Express Order Cat. #900-0915

VIP Database owners: Upgrade to the VIP Database III for $39.95 + $3 S/H. Send ORIGINAL disk and $42.95 total.

VIP Library /WDCE

The VIP Library /WDCE combines all six popular VIP application programs - VIP Database III, VIP Writer III, VIP Speller, VIP Calc III, VIP Terminal and VIP Disk-ZAP - into one program on one disk! The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail merge, spreadsheet financial analysis, telecommunications and disk maintenance. **DISK $179.95**

For VIP Library shipping please add $4 USA. $5 Canada. $10 Foreign.

VIP Library owners: Upgrade to the VIP Library /WDCE for $99.95 + $3 S/H. Send ORIGINAL disk and $102.95 total.

VIP Calc III

FAST 4 color POPUP menus • PRINT SPOOLER
32, 40, 64 and 80 Column HARDWARE display
Runs VERY FAST at double clock speed!

Now every CoCo 3 owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc III allows a large worksheet with up to 512 columns by 1024 rows! In addition, VIP Calc III has up to 16 windows which allow you to compare and contrast results of changes. Other features include 8 AND 16 digit precision • trig. functions • averaging • algebraic functions • column and row ascending and descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • create BAR charts. Embed printer control codes for customized printing. Combine spreadsheet data with VIP Writer documents to create ledgers, projections, statistical & financial budgets and reports. **DISK $69.95**

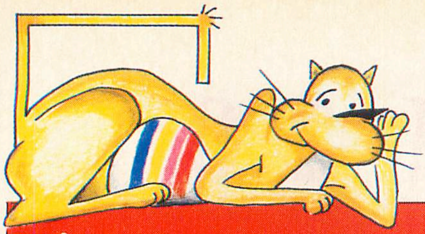
VIP Calc owners: Upgrade to the VIP Calc III for $29.95 + $3 S/H. Send ORIGINAL disk and $32.95 total.

All products run under RSDOS and are not copy protected.

VISA **SD Enterprises** MasterCard

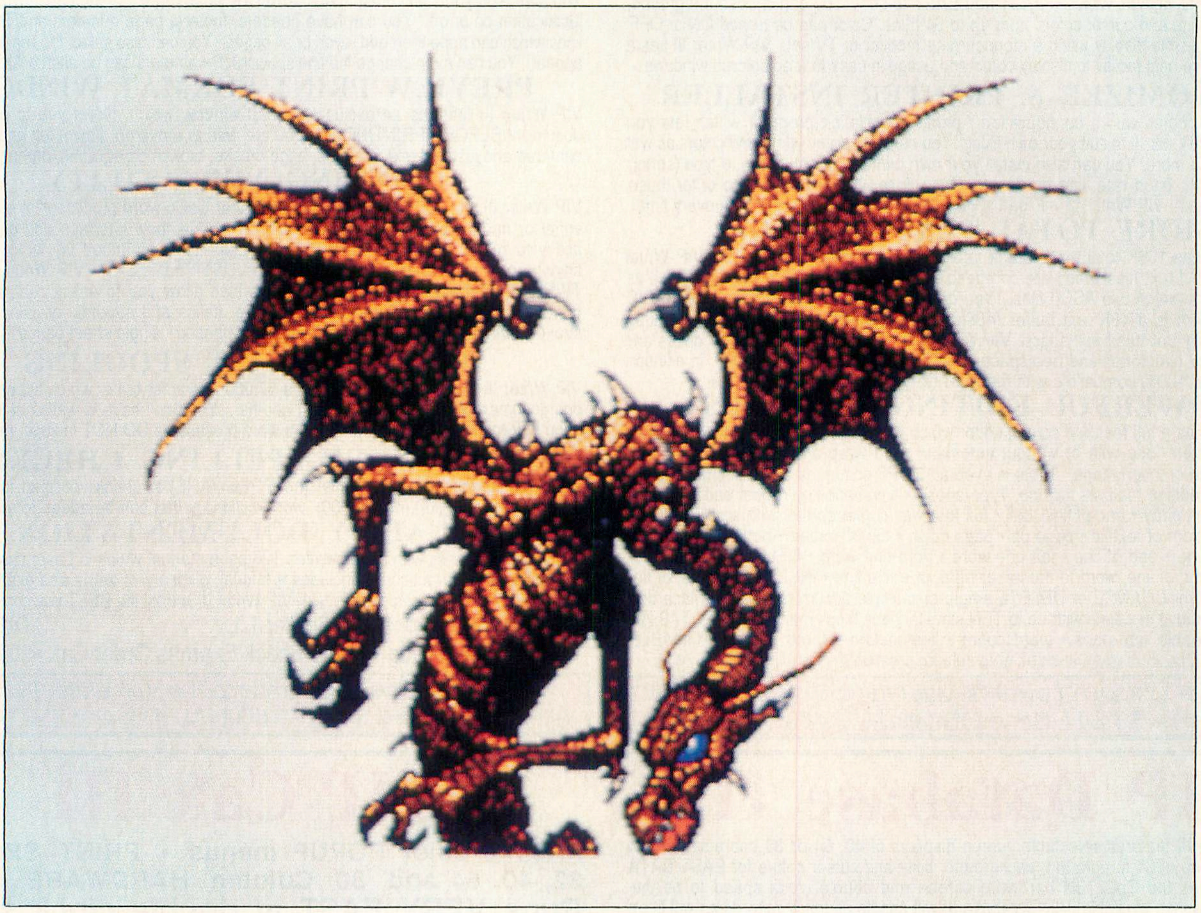
☎(503) 663-2865 ✉POB 1233 Gresham, OR 97030

Non VIP Library orders add $3 for shipping and handling in USA. Canada $4. Foreign $6. COD orders add an additional $2.25. Checks allow 3 weeks for delivery. Money order and VISA / MASTERCARD orders are shipped the same day.

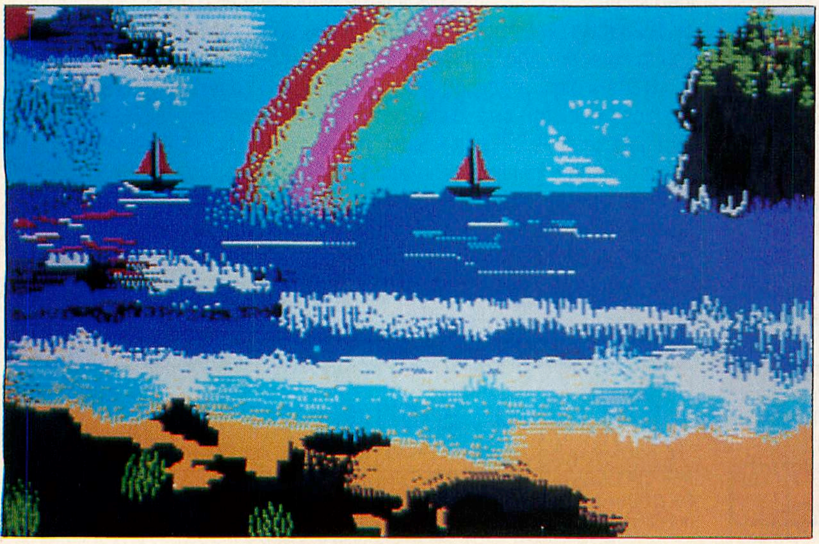


The CoCo Gallery

Live at Rainbowfest Princeton October 21-23, 1988



1



3

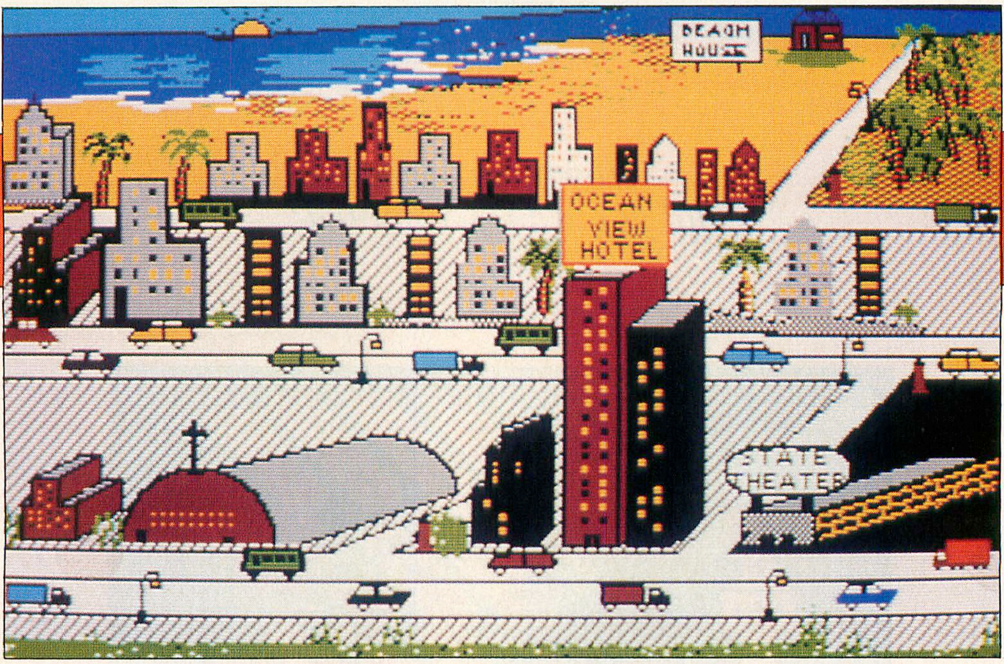
SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will forward two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Tony Olive, Curator



2

See Page 33 for the next CoCo Gallery Live exhibition at RAINBOWfest in Chicago!

(1) 1st Place
Evil Unleashed by Lori Dies

Lori, of Milton, Ontario, drew this nightmare creature using *The Rat*. It was the decisive winner at the show.

(2) 2nd Place
Seaside City by Howard C. Rouse

Where's the beach? Imagine sleeping on this tranquil, private beach far from the bustling city in the foreground. Howard lives in Ocala, Florida, and produced this graphic with *CoCo Max III*.

(3) 3rd Place
Red Sails by Howard C. Rouse

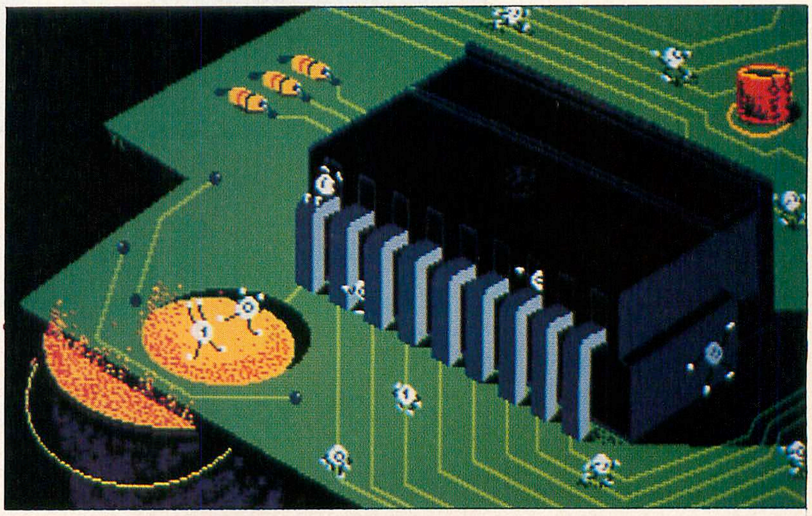
Those of us facing the cold winter will enjoy this ocean view. Howard is retired and finds the time to create wonderful graphics combining the best features of *CoCo Max III* and *Color Max 3*.

(4) Honorable Mention
Bit Bucket by Tracy Lammardo

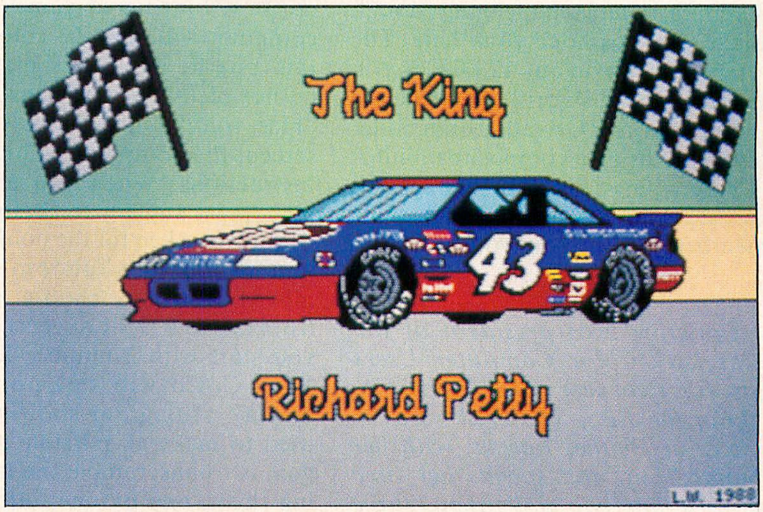
Tracy, of Clifton Park, New York, used *Max 9* (OS-9) to draw this abstract creation. She is a graphic designer and uses computer graphics and desktop publishing in her work.

(5) Honorable Mention
The King by Logan Ward

NASCAR fans will recognize this car, which was sent to us by the creator of CoCo Cat and Maxwell Mouse. Logan lives in Memphis, Tennessee, and generated this design with *Color Max 3*.

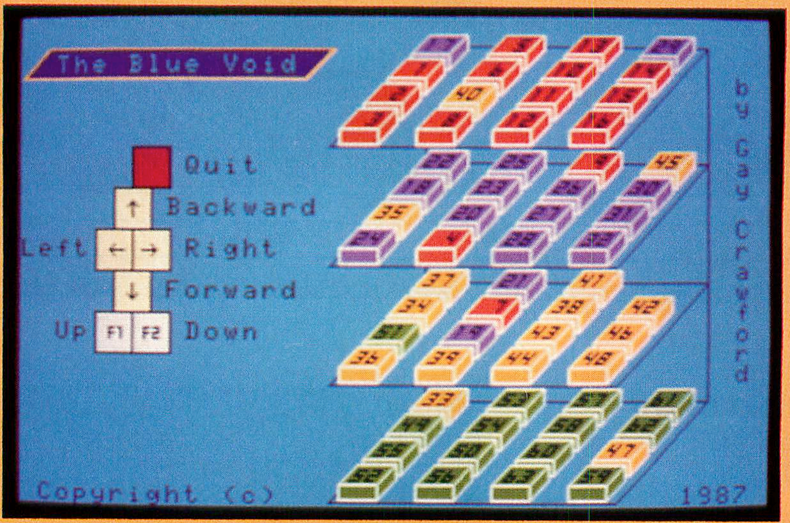


4



5

How many tiles did you want scrambled?



Tangled Tiles

By Gay Crawford

Blue Void is both a game and puzzle written for the Color Computer 3. The puzzle may look simple, but it is challenging enough to make you tear out your hair. The program will run on any 128K CoCo 3, with or without disk drives. I wrote the program with an RGB monitor in mind, so if you are using a composite monitor or TV, you may want to change the color values in lines 1480 through 1530. Remember: The display will not be as clear without an RGB monitor.

To begin, just load the program from disk or tape and run. The computer will create a four-tiered game board. The computer will place 63 colored tiles on this board. No tile is placed at one corner of the last tier; this area is the "blue void." Once the tiles are on the screen, the computer will display brief instructions. When you are ready to play, press any key to begin.

You are asked for the number of times you would like random tiles to be moved. You may choose any number from one to 999; however, I suggest that you start with a number less than 10. Your CoCo will scramble tiles and display a diagram showing the keys used to make all possible moves. Your goal is to unscramble the tiles by moving them, one by one, into the empty space, or void. You can move a tile to the front, back, left or right of each tier, and from one tier to another. However, you can move only one tile at a time, and that tile can move only one space at a time. When a tile is moved, its original location becomes the void.

There is neither a time limit nor a score for your efforts. Take your time to avoid scrambling the tiles further. If you become frustrated, press BREAK to exit the game. The tiles will be repositioned, and you can either start again or end the game entirely.

The program starts by setting up necessary arrays, variables, and data strings and creating the display (lines 10 through 470). By mixing initialization program lines with the lines that draw the screen, you make the beginning smoother. This keeps you from staring at a still screen while the computer gets ready.

Gay Crawford was president of the Kansas City Color Computer Users Group for two years and is the Co-SysOp of the BBS, The Frisky CoCo. She lives in Olathe, Kansas, with her husband, Tom, and spends her time caring for her two daughters, three CoCos and her cat, Macro.

Telewriter-128™

the Color Computer 3 Word Processor

TELEWRITER: UNDISPUTED #1

If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

Fact 1: Telewriter is undisputedly the #1 most popular word processor on the Tandy Color Computers.

Fact 2: Telewriter's exemplary ease of use and power have been acclaimed in numerous magazine reviews and in thousands of letters and calls from end users.

THE OTHERS DON'T UNDERSTAND

So why has Telewriter gained such a large and loyal following, while other Color Computer word processors have come and gone? Ironically, our competitors' ads tell you *exactly* why.

For them, word processing is nothing more than features and numbers. The longer the list of features, and the bigger the numbers, the better the word processor. Or so they think.

They just don't understand that power and ease of use are not gained by tacking on random features or throwing in freebie utilities or forcing you to use a cumbersome mouse.

Real Power, *true* Ease of Use, and *genuine* Speed can only be attained through thoughtful, logical, intelligent design, attention to detail, and a commitment to the act and the art of writing. That's the Telewriter tradition, and that's the reason for Telewriter's phenomenal success.

TELEWRITER—128: INTELLIGENT DESIGN PERFECTED

And now, Telewriter-128, the latest Telewriter, uses the added hardware power of the Color Computer 3 to bring this intelligent design to its logical perfection.

Telewriter-128 adds unsurpassed speed and important new features to the already impressive arsenal of Telewriter-64. Not just speed for speed's sake, or features for the sake of advertising—but speed where it counts and features that make you a more efficient, more effective writer.

Rainbow magazine put it this way: "Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user friendly. . . . The 81-page tutorial/user's manual is nicely done. It is written in easy to understand language but the program itself is so easy. . . . Most people will be able to use the software right out of the package."

TELEWRITER-128 OR DESKTOP PUBLISHING

Desktop publishing is nice for adding pictures and fancy fonts to newsletters or business presentations—but its graphics orientation sacrifices some important capabilities when it comes to working with words.

If your main concern is expressing ideas through words (notes, letters, reports, papers, novels, etc.), the dedicated word processing power of Telewriter-128 still provides the most efficient tool for the job. Each tool has its place—desktop publishing for striking visuals, Telewriter-128, for effective writing.

TELEWRITER-128 OR TELEWRITER-64

You can no longer afford to be without the ease, power, and efficiency, that Telewriter brings to everything you write.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

For the Color Computer 1&2, **Telewriter-64** costs $59.95 on disk, $49.95 on cassette.

To order by MasterCard or Visa,
call **(619) 755-1258** anytime, or send check to:

COGNITEC
704 Nob Avenue
Del Mar, CA 92014

(Add $2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and $41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing **1-800-321-3133.**

Ask for: **Telewriter-128** (disk) . . . cat #90-0909
Telewriter-64 (disk) . . . . cat #90-0254
Telewriter-64 (cass) . . . . cat #90-0253

FEATURES THAT MATTER: Telewriter's outstanding design and its complete set of features, put it in a class by itself, for smooth, efficient writing and letter perfect printed documents. Telewriter-128 includes:

Unbeatable SCREEN PERFORMANCE: lightning fast paging and scrolling, on-screen text that never lags behind your typing, and a response that is always instantaneous, no matter how much text is in the buffer, or where you are in the document.

26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The Online OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count, free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the Features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

After laying out the tiles, the computer displays the instructions. Lines 590 through 610 display the text for a certain amount of time and wait for a key to be pressed. The length of time is determined by Variable L and can be changed by altering the value 1000 in Line 610. This routine allows the computer to wait if the users do nothing, but also allows users to continue if they do not want to wait.

Line 1030 contains the values of the keys the computer recognizes. Every time a key is pressed during the game, the key is compared with the values contained in K$. If no matching value is found, that keystroke is ignored.

Arrays are used to keep track of the data for the numbers on the tiles, the tile positions and valid moves. Array A(216) contains codes that identify whether or not a position is legal. Without this ability, you could move tiles off the edge of the board or to nonexistent levels. Array WY(64) identifies the position of each tile. Array D1(16) contains codes for each tile shape on any level. Although all the tiles may appear the same at first glance, a tile in the back is of a different shape from one in the front because the entire tile cannot be seen. Finally, Array N$(9) holds the data for drawing the numerals, for they must be redrawn each time a tile is moved.

I use subroutines extensively in the program. They are a good way to do similar tasks many times while keeping the program compact. For example, one main subroutine handles the actual moving of the tiles (located in lines 1550 through 1640). This subroutine in turn calls other subroutines that take care of calculating the position for a tile (lines 2310 through 2380), erasing a tile (lines 2130 through 2220), and redrawing a tile in a different location (lines 1730 through 1850). Some of these subroutines even jump to *other* subroutines, so following this program can get rather complicated. Although complicated, this method let me use the same routines to play the game, lay out the tiles at the beginning of the game and replace them for each new game. Lines that begin with an apostrophe are REMARK statements. Do not remove these lines, for without them the computer would not know where to go.

Generally, I place all subroutines and DATA statements near the end of my program. Since I write lots of programs, this consistency keeps things neat and makes debugging the program easier.

My greatest computing thrill comes from using my CoCo to create something and watching other people enjoy what I have created. Perhaps this game will provide you some enjoyment and offer some ideas you can use to experience that same thrill.

(Questions or comments concerning this program may be directed to the author at 1001 Fredrickson, Olathe, KS 66061. Please include an SASE when requesting a reply.) ☐

220	56	1650	195
280	94	1930	153
680	89	2150	125
950	56	2430	129
1160	229	END	200
1410	123		

The Listing: BLUEVOID

```
1 '*****************************
2 '*     THE BLUE VOID         *
3 '*   COPYRIGHT (C)  1987     *
4 '*   BY  GAY D. CRAWFORD     *
5 '*****************************
6 '
10 CLEAR400
20 DIM A(216),WY(64),D1(16),N$(9
)
30 RGB:POKE &HFFD9,0:HSCREEN2
40 CLS:B=44:GOSUB1480
50 HDRAW"BM13,13C5G12R122E12L122
"
60 HPAINT(15,14),5,5
70 HDRAW"BM14,14C1G10R118E10L118
"
80 HPAINT(32,16),1,1
90 ONBRKGOTO2500:ONERRGOTO2500
100 FORL=1 TO 216:A(L)=0:NEXTL
110 HCOLOR0
120 HPRINT(2,2),"The Blue Void"
130 FORL=1 TO 64:WY(L)=L:NEXTL
140 FORJ=1 TO 4
150 FORK=1 TO 4
160 FORL=1 TO 4
170 A(B)=1:B=B+1:NEXTL
180 B=B+2:NEXTK:B=B+12:NEXTJ
190 HCOLOR1
200 HPRINT(1,23),"Copyright (c)
                   1987"
210 FORL=1TO 16:READ D1(L):NEXTL
220 A$="by Gay Crawford":Y=3
230 FORL=1 TO LEN(A$)
240 H$=MID$(A$,L,1)
250 HPRINT(38,Y),H$:Y=Y+1
260 NEXTL
270 N$(0)="L3G4R3E4"
280 N$(4)="G2NG2L3E2"
290 N$(1)="BL2LRG4"
300 N$(2)="NL3G2L3G2R3"
310 N$(3)="NL3G2NL2G2L3"
320 N$(5)="L3G2R3G2L3"
330 N$(6)="BL3G4R3E2L3"
340 N$(7)="BL3R3G4"
350 N$(8)="L3G4R3E2NL3E2"
360 N$(9)="BG4E4L3G2R3"
370 P$="L120G40R40ND5R80E40D46"
380 E$="C0L16G8DR15D6RE8U6"
390 DP$="L16G8ND2R16D6NLE8U6"
400 DW$="L16G8D6R16E8U6"
410 HDRAW"BM292,12C1XP$;XP$;XP$;
L120G40R120E40"
```

```
420 'lay tiles
430 FORL=1TO63:BN=L:GOSUB2310
440 F=INT(S/16)+3
450 H$="BM"+STR$(X)+","+STR$(Y)
460 GOSUB1810
470 NEXT
480 HPRINT(2,6),"The object of"
490 HPRINT(1,7),"the game is to"
500 HPRINT(1,8),"unscramble the"
510 HPRINT(1,9),"colored tiles."
520 HPRINT(2,11),"Use the arrow"
530 HPRINT(1,12),"keys, as  well
"
540 HPRINT(1,13),"as the F1 & F2
"
550 HPRINT(1,14),"to move a tile
"
560 HPRINT(1,15),"into the empty
"
570 HPRINT(1,16),"space, or the"
580 HPRINT(1,17),"Blue Void."
590 L=1
600 IFINKEY$<>""THEN620
610 L=L+1:IFL=1000 THEN620 ELSE6
00
620 HCOLOR0:HLINE(0,32)-(128,144
),PSET,BF
630 'start to play
640 HCOLOR9:B=173:VP=64:LM=0:SV=
0
650 HPRINT(1,7),"How many tiles"
660 HPRINT(1,8),"would you like"
670 HPRINT(1,9),"scrambled?"
680 HCOLOR1:X=7:S$=""
690 I$=INKEY$:IFI$=""THEN690
700 IFI$=CHR$(13) THEN 800
710 IFI$=CHR$(8) THEN 770
720 IFI$<"0"ORI$>"9"THEN690
730 IFX>9 THEN690
740 S$=S$+I$
750 HCOLOR1:HPRINT(X,11),I$
760 X=X+1:GOTO690
770 IFLEN(S$)=0 THEN S$="" ELSES
$=LEFT$(S$,(LEN(S$)-1)):X=X-1
780 HCOLOR0:HLINE(X*8,87)-(X*8+7
,95),PSET,BF
790 GOTO690
800 IFVAL(S$)<1 THEN620
810 SS=VAL(S$):HCOLOR0
820 HLINE(8,56)-(118,96),PSET,BF
830 FORSL=1TOSS
840 R=RND(6)
850 ONR GOSUB1660,1670,1680,1690
,1700,1710
860 IF A(B+V)=0 THEN 840
870 IF WY(VP+M)=LM THEN 840
880 GOSUB1550
890 NEXTSL
900 HDRAW"BM58,68C9R8U16L16D16R8
D16R8D16L8D16R8D16L32U16R8NR16U1
6L8U16R8U16R8"
910 HPAINT(50,71),10,9
920 HPAINT(38,119),2,9
930 HPAINT(56,56),8,9
940 HDRAW"BM58,84C9L8NL8D16NL8NR
8BD16D16"
950 HDRAW"BM50,73C9NG2NF2D6BD13B
L4L6NE2NF2BR14R6NH2NG2BL10BD13D6
NH2NE2"
960 HDRAW"BM40,126C9U2NR2U2R2BR2
RD4BR10U2NR2U2R2BR2R2D2L2D2R2"
970 HPRINT(9,7),"Quit"
980 HPRINT(8,9),"Backward"
990 HPRINT(0,11),"Left      Right
"
1000 HPRINT(8,13),"Forward"
1010 HPRINT(2,15),"Up      Down"
1020 'make moves
1030 K$=CHR$(10)+CHR$(8)+CHR$(94
)+CHR$(9)+CHR$(4)+CHR$(103)
1040 ONBRK GOTO1230
1050 I$=INKEY$:IFI$=""THEN1050
1060 K=INSTR(K$,I$)
1070 IFK=0 THEN1050
1080 ONK GOSUB1660,1670,1680,169
0,1700,1710
```

THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum). Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

THE BOOK - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jystk, sound, serial port, and using cassette and disk. $18.00 + $1.50 s/h.

THE ADDENDUM - Picks up where the BOOK left off. Describes ALL the CoCo 3 enhancements & how to use them with assembly language. The most complete GIME spec. WOW - Super-Res Graphics, Virtual Memory, New Interrupts, and more information not available elsewhere. Find out what the CoCo 3 can really do. $12.00 + $1.00 s/h.

COCO 3 SPECIAL Start your CoCo library right. See what the CoCo can really do and save money - buy the BOOK and ADDENDUM for only $27.00 + $2.00 s/h.

US check or money order. RI orders add 6% sales tax

TEPCO
68 James Court
Portsmouth, RI 02871

See Us On DELPHI

```
1090 IF A(B+V)=0 THENSOUND120,1:
GOTO1050
1100 GOSUB1550
1110 WC=64
1120 IFWY(WC)<>WC THEN GOTO1050
1130 WC=WC-1:IF WC=0 THEN 1140 E
LSE 1120
1140 HCOLOR8:SV=1
1150 HPRINT(1,5),"Congratulation
s"
1160 ONBRKGOTO2500
1170 FORL=1TO12
1180 FORK=3TO6:PALETTEK,RND(63)
1190 PLAY"L16T16O4CG":NEXTK,L
1200 GOSUB1480:HCOLOR0
1210 HLINE(0,50)-(128,132),PSET,
BF
1220 HCOLOR9
1230 HCOLOR0:HLINE(0,40)-(126,13
2),PSET,BF
1240 HCOLOR9
1250 HPRINT(1,7),"Would you like
"
1260 HPRINT(1,8),"to play anothe
r"
1270 HPRINT(1,9),"game?  (Y/N)"
1280 I$=INKEY$:IFI$=""THEN1280
1290 IFI$="N"THENGOTO2500
1300 IFI$<>"Y"THEN1280
1310 'reset tiles
1320 HCOLOR0:HLINE(8,40)-(126,80
),PSET,BF
1330 IFSV=1 THEN640
1340 IFWY(64)=64 THEN1370
1350 L=64:GOSUB2310
1360 GOSUB2100:WY(64)=64
1370 FORL=63 TO 1 STEP-1
1380 IFWY(L)<>L THENGOSUB1400
1390 NEXTL:GOTO640
1400 BN=L:GOSUB2310
1410 F=S/16+3:WY(L)=L
1420 H$="BM"+STR$(X)+","+STR$(Y)
1430 V=0:R=D1(D)
1440 ON R GOSUB 1730,1730,1810,1
730,1730,1810
1450 RETURN
1460 'end of main routine
1470 'subroutines
1480 PALETTE0,29:PALETTE1,8
1490 PALETTE2,63:PALETTE3,38
1500 PALETTE4,43:PALETTE5,52
1510 PALETTE6,16:PALETTE7,63
1520 PALETTE8,36:PALETTE10,62
1530 PALETTE9,0:RETURN
1540 'swap tile
1550 WY(VP)=WY(VP+M):BN=WY(VP):L
M=WY(VP):B=B+V
1560 L=VP+M:GOSUB2310:R=D1(D)
1570 F=HPOINT(X-1,Y+2)'get color
1580 ON R GOSUB1870,1920,1970,20
20,2070,2100'erase & recnstr
```

```
1590 L=VP:GOSUB2310:R=D1(D)
1600 H$="BM"+STR$(X)+","+STR$(Y)
1610 ON R GOSUB 1730,1730,1810,1
730,1730,1810'draw whl or partl
1620 PLAY"L16T16O4AB"
1630 VP=VP+M:WY(VP)=64
1640 RETURN
1650 'pick a direction
1660 V=-1:M=-1:RETURN
1670 V=6:M=4:RETURN
1680 V=1:M=1:RETURN
1690 V=-6:M=-4:RETURN
1700 V=-36:M=-16:RETURN
1710 V=36:M=16:RETURN
1720 'draw partial tile
1730 IF V=1 THEN GOSUB1810:RETUR
N
1740 HDRAW"XH$;C7XDP$;"
1750 HPAINT(X-2,Y+2),F,7
1760 HDRAW"XH$;C2XDP$;G8"
1770 HPAINT(X-9,Y+13),F,2
1780 GOSUB2400
1790 RETURN
1800 'draw whole tile
1810 HDRAW"XH$;C7XDW$;"
1820 HPAINT(X-4,Y+2),F,7
1830 HDRAW"XH$;C2XDW$;G8NL16D6"
1840 GOSUB2400
1850 RETURN
1860 'rear left corner d=1
1870 GOSUB2130
1880 H$="BM"+STR$(X+1)+","+STR$(
Y+5)
1890 IF L=1 THEN HDRAW"XH$;C1L19
G4" ELSE HDRAW"XH$;C1L19NU5G4"
1900 RETURN
1910 'side tile d=2
1920 GOSUB2130:IF V<>1 THENGOSUB
2240
1930 H$="BM"+STR$(X)+","+STR$(Y)
1940 IF V=-1 THEN HDRAW"XH$;C1BL
13BG2G9" ELSE HDRAW"XH$;C1BL13BG
2G7"
1950 RETURN
1960 'front left corner d=3
1970 GOSUB2190:GOSUB2240
1980 H$="BM"+STR$(X+1)+","+STR$(
Y+2)
1990 IF V=1 THEN HDRAW"XH$;C1BL1
6NE2G10" ELSE HDRAW"XH$;C1BL16G1
0"
2000 RETURN
2010 'rear tile d=4
2020 GOSUB2130
2030 H$="BM"+STR$(X+1)+","+STR$(
Y+5)
2040 HDRAW"XH$;C1L22"
2050 RETURN
2060 'middle tile d=5
2070 GOSUB2130:GOSUB2240
2080 RETURN
```

```
2090 'front tile d=6
2100 GOSUB2190:GOSUB2240
2110 RETURN
2120 'erase partial tile
2130 IF V=-1 THEN GOSUB2190:RETU
RN
2140 H$="BM"+STR$(X)+","+STR$(Y)
2150 HDRAW"XH$;XE$;"
2160 HPAINT(X-2,Y+2),0,0
2170 RETURN
2180 'erase whole tile
2190 H$="BM"+STR$(X)+","+STR$(Y)
2200 HDRAW"XH$;C0L16G8D6R16E8U6"
2210 HPAINT(X-2,Y+2),0,0
2220 RETURN
2230 'redraw rear tile
2240 IF V=1 THEN RETURN
2250 C=HPOINT(X-2,Y-3)
2260 H$="BM"+STR$(X+2)+","+STR$(
Y-1)
2270 HDRAW"XH$;C2D5L16U5"
2280 HPAINT(X,Y),C,2
2290 RETURN
2300 'calculate x,y for each til
e
2310 S=L-1
2320 X1=(S/4-INT(S/4))*-40+190
2330 X2=INT(((S/16)-INT(S/16))*4
)
2340 X2=X2*32:X=X1+X2
2350 Y1=(S/4-INT(S/4))*40+7
2360 Y2=INT(S/16):Y=Y1+(Y2*46)
2370 D=((S/16-INT(S/16))*16)+1
2380 RETURN
2390 'draw numbers
2400 L$=STR$(BN):DL=LEN(L$)-1
2410 D=VAL(RIGHT$(L$,1))
2420 D$=N$(D)
2430 HDRAW"XH$;C9BL6BD2XD$;"
2440 D$=MID$(L$,DL,1)
2450 IFD$=" "THEN2480 ELSE D=VAL
(D$)
2460 D$=N$(D)
2470 HDRAW"XH$;C9BL12BD2XD$;"
2480 RETURN
2490 DATA 1,2,2,3,4,5,5,6,4,5,5,
6,4,5,5,6
2500 WIDTH40:HSCREEN0
2510 POKE&HFFD8,0:CLS0
2520 LOCATE9,10
2530 ATTR 1,0
2540 PRINT"Thanks for playing"
2550 LOCATE12,12
2560 PRINT"The Blue Void"
2570 FORL=1TO2000:NEXTL:WIDTH32:
RGB
```

SPECIAL EVENT!

COCO GALLERY LIVE
SHOWCASE YOUR BEST AT RAINBOWFEST

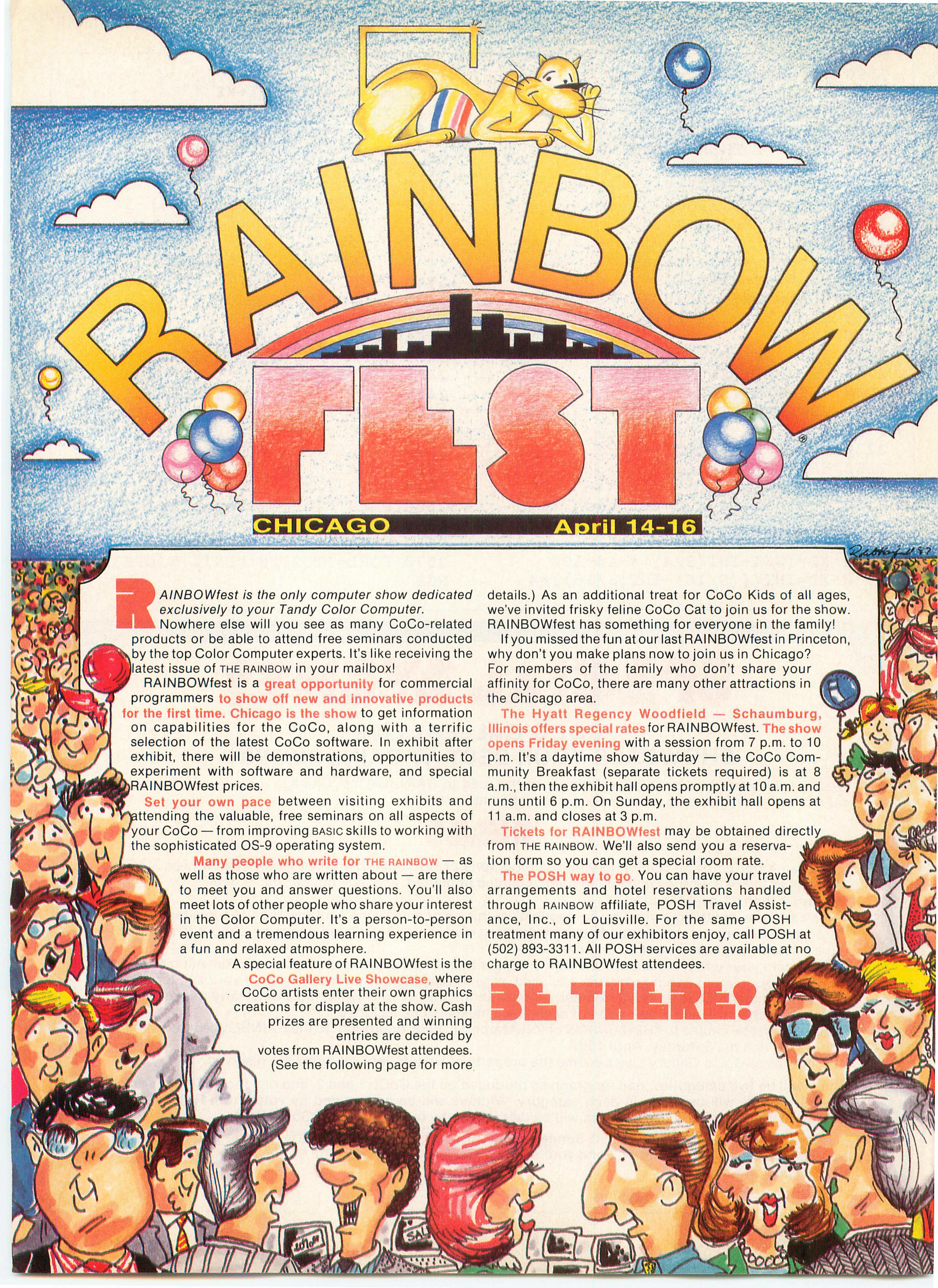
We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Chicago — and we'd like you to submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries must be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries must be mailed to THE RAINBOW before March 31, 1989, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, April 15th.
- All entries to CoCo Gallery Live become the property of Falsoft, Inc., all rights are reserved.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, April 16, 1989, and winning entries will be published in the August '89 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.



RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Chicago is the show** to get information on capabilities for the CoCo, along with a terrific selection of the latest CoCo software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **CoCo Gallery Live Showcase,** where CoCo artists enter their own graphics creations for display at the show. Cash prizes are presented and winning entries are decided by votes from RAINBOWfest attendees. (See the following page for more details.) As an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield — Schaumburg, Illinois offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!

FREE SEMINARS

Cray Augsburg
RAINBOW Technical Editor
OS-9 For Absolute Beginners

Bill Bernico
RAINBOW Contributing Editor
BASICally Speaking

Steve Bjork
SRB Software
Writing Game Software

Chris Burke
Burke & Burke
Hard Drive Systems

Kevin Darling
Independent Programmer
Overview of OS-9

Art Flexser
SpectroSystems
Extending the Capabilities of BASIC

Dr. Martin Goodman, M.D.
RAINBOW Contributing Editor
Two CoCo Consultations Live

Ed Hathaway
Glenside CoCo Club
Organizing a CoCo Club

Cecil Houk
Rulaford Research
Music, MIDI and the CoCo

Jutta Kapfhammer
RAINBOW Managing Editor
Writing for Publication

William Nee
Independent Programmer
Machine Language Made BASIC

Dale Puckett
RAINBOW Contributing Editor
Overview of BASIC09

Dick White
RAINBOW Contributing Editor
Spreadsheets for the CoCo

Sister Berdelle Wiese
Community Computer Consultant
CoCo and the Teacher

COCO COMMUNITY BREAKFAST

Rick Adams — Software Developer

Our keynote speaker for the traditional CoCo Community Breakfast is Rick Adams, who is the founder of Color Central Software and the author of programs like *DELPHIterm*, Tandy's *Temple of ROM* and Activision's CoCo 3 version of *Shanghai*.

Mr. Adams will describe his life as a programmer on the "front lines" of the ongoing efforts to program software for the CoCo 3, including humorous "war stories" from some of his software developments.

Don't forget . . .

If yours is one of the first 500 ticket orders, a coupon for a complimentary issue of The Second RAINBOW book of Simulations will be enclosed with your tickets — if yours is one of the first five orders received from your state, a coupon for a complimentary RAINBOWfest T-shirt will be enclosed with your tickets. So hurry up and place your order to take advantage of this offer.

RAINBOWfest - Chicago, Illinois
Dates: April 14-16, 1989
Hotel: Hyatt Regency Woodfield
Rooms: $66 per night, single or double
Advance Ticket Deadline: March 31, 1989

Join us at a future RAINBOWfest!

RAINBOWfest - Somerset, New Jersey
Dates: October 20-22, 1989
Hotel: The Somerset Hilton
Rooms: Single, $65 per night; Double, $75 per night
Advance Ticket Deadline: October 6, 1989

FREE T-Shirt to first five ticket orders received from each state.

First 500 ticket orders received get *The Rainbow Book of Simulations.*

YES, I'm coming to **Chicago!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

____ Three-day ticket(s) at $9 each total ______

____ One-day ticket(s) at $7 each total ______
Circle one: Friday Saturday Sunday

____ Saturday CoCo Breakfast at $12 each total ______

____ RAINBOWfest T-shirt(s) at $6 each total ______
Specify size:
____ S ____ M ____ L ____ XL
(T-shirts must be picked up at the door)
Handling Charge $1 ______

TOTAL ENCLOSED ______

(U.S. Currency Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency Woodfield ($66, single or double room).

Name ________________
(please print)
Address ________________
City __________ State ______
Telephone __________ ZIP ______
Company ________________

☐ Payment Enclosed, or Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ________________
Exp. Date ________________
Signature ________________

Advance ticket deadline: March 31, 1989. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

The first in a series of tutorials to help you create your own database system

The Do-It-Yourself Database: Subroutines and Program Code

By Richard Perlman

Your Color Computer is a powerful piece of hardware that can be used for more than game playing and word processing. You can use it to keep track of finances, important dates, appointments, collections, catalogs, things loaned and borrowed, and so on. For this, you need a *database* and a disk on which to store the information.

To set up a database, you don't have to know much about the system *or* disks. You don't need to use assembly language, and you don't have to be an experienced BASIC programmer. All you must do is follow the steps described here. I will demonstrate the coding and programming techniques you need. When we're done, you'll have a working database you can use to manage money, pay bills and balance a checkbook. And if that isn't to your liking, you can modify your database any way you choose. (I have one version that keeps track of my videotape collection.)

TANDY
128K COLOR COMPUTER 3
FINAN
BIL
BANK
APPOINTMENTS
ADDRESSES

If you already have a disk drive, you can code and run all my examples. If you don't own a disk, you can try many of them and learn more about your CoCo. Although I won't bombard you with lots of super-technical information, I would like to offer some useful programming tips before we begin our database.

What Is a Database?

A database is information stored by following a set of rules. When most of us think of databases, we think of computers. A database doesn't have to be on a computer, however. We are all familiar with the telephone book, and that list of names, phone numbers and addresses is a database. The telephone book is a database because it follows a set of rules — the data is kept in alpha-

---

Richard Perlman spends his time at work helping others use their PCs. At home, he shares his CoCo 2 with his wife and two children.

betical order by name, and the name is followed by the appropriate address and telephone number. If the telephone company chose not to follow these rules, it would be more difficult — perhaps impossible — to use the information at all. And it wouldn't be a database.

A computerized database uses the computer's disk memory to store information. It also uses programmable logic to add information to the database (front-end) and to retrieve information (output-writer). Remember: If you can't easily add data to or retrieve data from your system, you don't have a useful database.

Many computer systems use a menu format for both the front-end and output-writer. A menu is a list of choices displayed on the screen. You choose one from the list, and the system takes it from there. The system may need to display several menus to narrow your choices and figure out precisely what you want. Sometimes the program must also ask you to enter information, but the system should not allow you to give it information or instructions it cannot process properly. This is messy and disregards the rules followed by any self-respecting database system (especially ours).

Where Do We Begin?

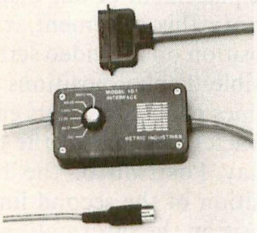
We must first encode the menus and information requests. Let's begin by looking at some programming techniques that will help us do those things more easily — subroutines, loops and and Computed `GOTO`s. These routines will be used throughout our system. Don't be put off by their unusual names. Computer languages include many unfamiliar terms, but these terms will be easier to understand as we proceed.

A subroutine is a special set of instructions that does something specific (like converting hours and minutes into seconds). You write these instructions once in a program and return to them any time you want those instructions followed. This shortens your program and lessens the possibility of an error. Because we will use menus in several sections of our program, the subroutine technique will be quite useful. Listing 1 includes a subroutine that displays a menu with one to four choices.

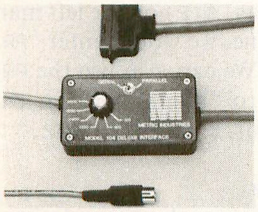
When Listing 1 is run, it clears the screen, displays four lines at the top of the screen and then stops at Line 40. The entire program is not a subroutine. The program starts at Line 10 and ends at Line 600. On the other hand, the subroutine begins at Line 500 and ends on Line 550. Line 40's `GOSUB 500` lets us use (or call) this subroutine. At the end of the subroutine, Line 550's `RETURN` statement returns us to the statement immediately following the `GOSUB`. Thus, the program returns to the `STOP` statement in Line 40, and the program stops.

The subroutine was written to be flexible. With only minor changes, you can display fewer lines or change the text. The actions of the subroutine depend upon conditions you set up before you call it. By changing the setup, you change the subroutine's response. This makes using the subroutine in other parts of the program simpler. In this subroutine, you control the number of lines displayed by placing that value in Variable `NL`. The text is placed in variables `L1$` through `L4$`. The `GOSUB` statement calls the subroutine, and `RETURN` restores you to Line 40. Although you must have a `RETURN` statement at the end of the subroutine, be careful not to use `RETURN` if you are not writing a subroutine. If you do, your program will stop running at the `RETURN`

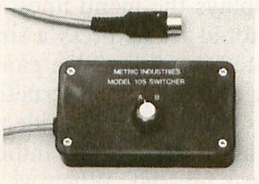
METRIC INDUSTRIES, INC.



Model 101
Serial to Parallel Printer Interface
- ★ Works with any COCO
- ★ Compatible with "Centronics" Parallel Input Printers
- ★ Just turn the knob to select any one of 6 baud rates 300-9600
- ★ Comes complete with cables to connect to your printer and computer
- ★ Can be powered by most printers



Model 104 Deluxe Interface with "Modem Switch"
- ★ **Same Features as 101 Plus**
- ★ Built in Serial Port for your Modem or other serial device
- ★ Switch between Serial Output and Parallel Output
- ★ Comes with cables to connect to your computer and printer
- ★ Can be powered by most printers



Model 105 Serial Switch
- ★ Connects to your COCO to give you 2 switch selectable Serial Ports
- ★ Comes with a 3 foot cable to connect to your computer
- ★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
- ★ Does not require power

Cassette Label Printing Program
- ★ **New Version 2.1 prints 7 lines** of information on Cassette labels
- ★ Comes on Tape with instructions to transfer to disk
- ★ Menu driven, very easy to use
- ★ **Save and Load Labels from Tape and Disk**
- ★ Uses the features of your printer to print standard, expanded, and condensed characters
- ★ **Automatically Centers Each Line of Text**
- ★ Allows editing of label before printing
- ★ Program comes with 24 labels to get you started
- ★ 16K ECB required

Some of the Printers That Can –
Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot –
Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List

Model 101	35.95
Model 101P	41.95
Model 104	44.95
Model 104P	51.95
Model 105	14.95
Cassette Label Program	6.95
Pin Feed Cassette Labels:	
White	3.00/100
Colors (specify)	3.60/C
Red-Blue-Yellow-Tan	

4 Pin Din Serial COCO Cables:

Male/Male 6 foot	4.49
Male/Female 6 foot	4.49
Female/Female 6 foot	4.49
Other Lengths Available.	

All items covered by a 1 year warranty

Ordering Info
- ★ **Free Shipping** in the U.S.A. (except AK and HI) on all orders over $50
- ★ On orders under $50 please add $2.50 for shipping and handling
- ★ On orders outside the U.S.A. please write or call for shipping charges

You Can Pay By:
- ★ VISA or MasterCard
- ★ C.O.D. - add $2.25
- ★ Or send check or money order payable in U.S. funds

Metric Industries Inc.
P.O. Box 42396
Cincinnati, OH 45242

(513) 677-0796

statement because it has nowhere to *return.*

To demonstrate the flexibility of the subroutine, let's display only three lines this time. To do this, I changed the value in `NL` before calling the subroutine again and entered `CONT`, which lets the program resume running after the `STOP` in Line 40.

The FOR/NEXT Loop

There are four `PRINT` and three `IF` statements in our subroutine. We can eliminate most of them by using `FOR/NEXT` loops. A `FOR/NEXT` loop is a set of instructions that repeats itself (or loops back) for a specific number of times. We can use a `FOR/NEXT` loop to add three to itself five times and display the result after each addition. In Figure 1, this procedure is completed first with a `FOR/NEXT` loop and then without it.

Both sets of code do the same thing, but the `FOR/NEXT` loop requires much less program code. In both examples, Line 100 includes Variable `I`, the index. The `FOR` instruction in Line 100 does two things. It sets up the loop, and it tells the computer that `I` is the index, its starting value is `1`, and its ending value will be `5`. The `FOR` instruction runs all instructions between itself and the `NEXT` statement. It also adds one to the index during each pass. Until `I` is equal to five, the `FOR` instruction will run the instructions between itself and the `NEXT` statement. Therefore, this group of `FOR/NEXT` statements will run five times, and then the loop will be over. When the loop is over, the statement following `NEXT I` will run, and the program will stop.

Lists Made Easy: The Array

In addition to `GOSUB`s and `FOR/NEXT` loops, we will use arrays in our database. An array is a useful method of holding lists of information — something a computer does well. The lists will have names, and each item in each list will have an item number. We can then refer to each item by using its *array name* and *item number.* In our menu subroutine, we stored the lines we wanted to display in the variables `L1$`, `L2$`, `L3$` and `L4$`. However, we would have problems if we tried to display 10 or more items because array names can include no more than three characters. To remedy this problem, we will use an `L$` array and store the lines in the variables `L$(1)`, `L$(2)`, `L$(3)` and `L$(4)`. The item numbers (`1` to `4`) are subscripts, and an array can have thousands of them. The following example takes our original subroutine and recodes it to use both a loop and an array:

```
100 CLEAR 500
110 DIM L$(10)
200 L$(1) = "1= FIRST CHOICE ON THE MENU
210 L$(2) = "2= SECOND CHOICE ON THE MENU
220 L$(3) = "3= THIRD CHOICE ON THE MENU
240 L$(4) = "4= FOURTH CHOICE OF MENU
250 NL = 4 'NUMBER OF CHOICES
260 GOSUB 500
270 STOP
500 CLS:FOR I = 1 TO NL
510 PRINT L$(I)
515 NEXT I
520 RETURN
```

Compare this routine with our original example. We still must place a value in `NL` and place the display lines in the `L$` array. The recoded subroutine is three lines shorter and much simpler, however, because the `FOR/NEXT` loop does all the checking for us. The index is used to pick out the items to display.

However, the computer isn't all that smart. We must tell it (in a separate statement) that `L$` is an array, and we must identify the maximum size of the list. To do this we use a `DIM` statement on Line 110. The `DIM` statement tells the computer that `L$` is an array and that it should be set up so we can use subscripts from zero to 10 when we work with it. Although we are using only four items, our array can hold a maximum of 11 items. You can use as few items as you want — just don't exceed the maximum.

Our First *Real* Menu

It is easier to use a menu if we know the menu's purpose and the expected response to the menu. So before we display the choices, we will clear the screen, put a brief explanation on the top line and place instructions on the next display line. That will leave us with a proper menu.

Because we will now use the first two lines to display something other than menu choices, we must display these items lower on the screen. CoCo's BASIC comes to our aid by giving us a `PRINT` statement (`"PRINT @` *xx*`"`) that allows us to control the placement of our display on the screen. In this statement, *xx* is the display position on the video screen. The 512 possible display positions are divided into lines of 32 characters each. The first character position of the first line is Display Position 0, the first character position of the second line is 32, etc. To position the information we placed in Array `L$(2)` on the left margin of the third line, we would enter `"PRINT @96,L$(2)"`. We can also use the `PRINT @` statement to "blank out" an entire line. To do this, enter `PRINT @32," "`.

Time to Type

After it displays the menu lines, our subroutine should let us press a single key to indicate our choice. We can do this by using the `INKEY$` instruction. `INKEY$` allows the computer to identify which key was pressed or to indicate that no key was pressed. When we use `INKEY$`, the screen will not display the key that was pressed, nor is it necessary to press ENTER to indicate that your typing is complete. The following routine shows that you pressed a key:

```
100 CLS:PRINT "-- WAS ANYTHING TYPED? --"
110 A$ = INKEY$:IF A$ = "" GOTO 110
120 PRINT @64,"YES, SOMETHING WAS TYPED"
130 GOTO 110
```

FOR/NEXT Code

```
100 FOR I= 1 TO 5
200 N = N + 3
250 PRINT N
300 NEXT I
301 STOP
```

Normal Code

```
100 I=0
101 I=I+1
102 IF I>5 THEN GOTO 301 ELSE N=N+3
103 PRINT N:GOTO 101
301 STOP
```

Figure 1: Adding 3

Computed GOTO Code

```
200 GOSUB 9020
201 ON A GOTO 300,400,500,600
210 STOP
```

Normal Code

```
200 GOSUB 9020
201 IF A = 1 GOTO 300
202 IF A = 2 GOTO 400
203 IF A = 3 GOTO 500
204 IF A = 4 GOTO 600
210 STOP
```

Figure 2: GOTOs

This program will stay on Line 110 until you type something. When a key is pressed, the program will print a message on the third display line. Look at Line 110. The two quotation marks with nothing between represent a *null* character. Therefore, the statement `IF A$ = "" ..."` tells the program that if nothing was typed, then Line 110 must be redone. I've included this technique in Listing 2.

When this program is run, the menu display begins Position 96 (`SL`) and will display four lines of information (`NL`). You then type a number to indicate your choice. If your choice is accepted, it is displayed on the screen, and you get to press another key. If you press 4, the program will stop. If your choice is not accepted, you must press another key.

The subroutine starts at Line 9000. While lines 9000 to 9001 display the menu lines, lines 9005 through 9010 place the message "Select from the following " on the second display line and cause it to blink on and off until you press a key. The blink rate is determined by the highest value for `I` in the `FOR` statements on lines 9006 and 9008. Try changing these values, and see what you get. As soon as you type a character, the program will go to Line 9012. Lines 9012 and 9013 ensure that the value you have entered is a number between one and four (the value of `NL`). If these requirements are met, then the `RETURN` statement in Line 9012 resumes the program at Line 270. When the subroutine returns, the value in Variable `A` will be the number you entered. This number will be used in Line 270 to determine what will be displayed and in 280 to determine what action will be taken.

If the subroutine didn't check our typing, then the program could stop running, since Line 270 will not work if the value of `A` is not between one and four. We also used the value of `A` in Line 280 to determine whether the program will stop or ask for another choice. In a *real* menu, there could be more than four choices, and we would have a lot of checking to do after the subroutine returns.

The Computed GOTO

BASIC has a nice feature to help us check our subroutine called the *Computed* `GOTO`. Figure 2 shows how this statement works and what we would need to enter if it didn't exist. (Don't enter this yourself since it is not a complete program.)

The Computed `GOTO` on Line 201 puts four instructions on a single line, and that's far from the limit. You can put many more instructions in a Computed `GOTO`. I haven't figured out what the limit is, but I've never exceeded it. And unless you do some fancy programming, you won't either.

Multiple Menus for Marbles

Listing 3 shows how we can use the techniques we have described to employ more than one menu in a program. This program doesn't do anything useful, but it does work. The program maintains a database containing information about my marble collection. To save time and space, only some of the choices have been programmed, but I've included enough working code for you to see menu switching at work. Where a choice is not programmed, I will display the choice made and allow another choice. The first menu will give us five options:

1. Add marbles to the database.
2. Change the database.
3. Delete from the database.
4. Report from the database.
5. End the session.

The menus that follow allow other options, but we must return to the first menu to end the session. Enter Listing 3 and see if it works. Try each option on each menu. Then change the program by putting in your own descriptions and experiment with moving the display lower on the screen. But don't change the subroutine. We will use it later. I used `CLS0` to create the dark screen, but you can use `CLS` if you prefer.

No! No! We Won't GIGO!

As mentioned before, it is important to keep incorrect information out of your database. This is difficult because you have to decide beforehand what is *correct* and what is not. Numbers are fairly easy to check because we usually have a good idea what the highest and lowest acceptable values will be. The following program code will determine whether or not a number is too high:

```
100 PRINT @32,"ENTER A NUMBER FROM 1 TO 2000"
110 INPUT A
120 IF A < = 2000 AND  A = > 1 THEN GOTO 150
130 PRINT A;" IS OUT OF RANGE":GOTO 100
150 PRINT A;" IS IN RANGE":GOTO 100
```

But what about money? This program code would not prevent you from entering 1.275 or 1275, when you wanted to enter 12.75. It would also move the display farther and farther

THE BEST
GOT BETTER

WARGAME DESIGNER SYSTEM $29
The best selling COCO3 games and game design system just got BETTER. A new icon editor, faster design, and more! If you haven't got it, get it. Upgrades - Registered Sw customers, send original disks & $7 to cover postage & disks cost. See August 88 Review!

WARGAME DESIGNER ACCESSORY:

WGD ICON DISK #1 $15
528 NEW ICONS! 8 complete sets of unit & terrain icons ready to view, identify and transfer to your game disks. Even get a printout listing colors used & identifying each icon in the set. A MUST HAVE WGD flippy. Combine to add 64 new sets!

WGD STAND ALONES each just $15
INVASION NORTH
Land, air & water. 9 objectives.
ATTACK ON MOSCOW
A WW2 recreation of the German assult.
ROBOT COMMAND
Trouble in Detroit, 1995 AD.
DUNGEON WARRIOR
Help! Damsel in distress.
GHOST HUNTERS
These spirits are deadly.
ORC AMBUSH
Recover the wizard's treasured herbs.
ZULU REVENGE
Pits British against Africa's finest.
DESERT RATS
Fight for oil in the sands of Africa.
ISLAND DOMINATION
2 tribes battle for control land & sea.
FORT APACHE
Cowboys & Indians in the old West.
TECH WARS
Machine vs. machine in the year 2500 AD.
ROTC
Classic combat training. Board gamers dream.

MORE FUN FROM SPORTSware

GRIDIRON STRATEGY $21
IMPROVED version adds a 1 player option. Play against a friend or just open the box and take on the computer. Upgrades - return original disk & $5 for new disk & mailing costs.

WEEKLY WINNER 2.0 only $15
It's a winner! Nov. 16, 1988 WW2.0 got 5 of 6 in the Ohio Super Lotto. We have proof on file. Now for COCO2 & 3 on disk & tape.

CATALOG ON DISK Just $3
See them all on this packed flippy disk. Deduct $3 from any product ordered from the disk. Many more products than seen here. Great graphics. Get it! COCO3 only.

* * *

FEBRUARY FREEBY
Get MAIL MASTER free with any order placed this month. A $25 value FREE!
(catalog orders excluded)

* * *

VISA & MASTERCARD orders accepted.
We pay shipping always.

SPORTSware
1251 S. Reynolds Road, Suite 414
Toledo, Ohio 43615
(419) 389-1515

down the screen if you entered something that wasn't a number, which isn't good if you are trying to format an input screen. To make sure that the entry is a number having two (and only two) decimal places and that it will be entered on the same line, you need a routine something like the following:

```
95 CLS
100 PRINT @32,"ENTER 1.00 TO 99.00"
110 INPUT A$
112 L=LEN(A$)
114 IF L < 3 GOTO 135
116 IF MID$(A$,L-2,1) <> "." GOTO 135
118 A = VAL(A$)
120 IF A < = 99 AND  A = > 1 THEN GOTO 150
130 PRINT A;" IS OUT OF RANGE":GOTO 100
135 PRINT A$;" IS OUT OF RANGE":GOTO 100
150 PRINT A;" IS IN RANGE":GOTO 100
```

New BASIC Statements

In our last example, we used the BASIC statements `INPUT` (Line 110), `LEN` (Line 112), `MID$` (Line 116) and `VAL` (Line 118). Let's review their uses:

`INPUT`	Lets you enter as many characters as you need, unlike `INKEY$`, which only accepts one character. `INPUT` also shows you what you are typing, lets you backspace and type over and waits for you to press ENTER before continuing.
`LEN`	Tells you how many characters there are in a character variable.
`MID$`	Lets you examine and change specific characters.
`VAL`	Turns a character variable into a numeric one. If the character variable is not a number, then your result is zero.

Now we need to check character variable entries like names and addresses. These can contain any combination of letters, numbers and punctuation, and they are difficult to check with the same precision as numbers. Our only reasonable test on this data would determine whether or not it is too long for the program to use properly. We can use the `LEN` instruction for this and combine all these checks into one subroutine. The subroutine will check three types of information: numbers without decimals, decimal numbers with two decimal places and alpha-numeric character strings such as names or addresses. The subroutine will print a message requesting data, enter the response, check to make sure it is within a range of values and allow re-entry if we have made a mistake. Listing 4 shows how we would use such a subroutine.

Listing 1: `SUBDEMO`

```
10 CLEAR 500
15 L1$ = "FIRST ITEM ON THE MENU
20 L2$ = "SECOND ITEM ON THE MENU
25 L3$ = "THIRD ITEM ON THE MENU
30 L4$ = "FOURTH ITEM ON THE MENU
35 NL = 4 'NUMBER OF CHOICES
40 GOSUB 500:STOP
50 NL=3:GOSUB 500:GOTO 600
500 CLS:PRINT L1$
510 NL = NL - 1
515 IF NL = 0 GOTO 550
520 PRINT L2$:NL=NL-1:IF NL = 0 GOTO 550
530 PRINT L3$:NL=NL-1:IF NL = 0 GOTO 550
540 PRINT L4$
550 RETURN
600 END
```

Listing 2: `REALMENU`

```
100 CLEAR 500
105 DIM L$(10)
110 CLS:PRINT @0,"--------  FIRST MENU  ---------
200 L$(1) = "1= FIRST CHOICE ON THE MENU
210 L$(2) = "2= SECOND CHOICE ON THE MENU
220 L$(3) = "3= THIRD CHOICE ON THE MENU
240 L$(4) = "4= STOP THE PROGRAM
250 NL = 4:SL=96
260 GOSUB 9000
270 PRINT @352,L$(A),"WAS CHOSEN
280 IF A= 4 THEN STOP ELSE GOTO 250
9000 FOR I= 1 TO NL:PRINT @SL,L$(I)
9001 SL= SL+32:NEXT I
9005 PRINT @32,"* SELECT FROM THE FOLLOWING
9006 FOR I = 1 TO 200
9007 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9008 PRINT @32," ":FOR I = 1 TO 65
9009 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9010 GOTO 9005
9012 A = VAL(A$):IF A > 0 AND A < NL+1 THEN RETURN
9013 GOTO 9005
```

Listing 3: `MARBLE1`

```
100 CLEAR 500
110 DIM LI$(6)
120 CLS0:PRINT "--  MARBLE DATABASE  OPTIONS  --
130 LI$(1)="1= ADD MARBLES TO THE DATABASE
132 LI$(2)="2= CHANGE WHAT'S IN THE DATABASE
134 LI$(3)="3= DELETE MARBLES FROM DATABASE
136 LI$(4)="4= REPORT FROM THE DATABASE
138 LI$(5)="5= END THIS SESSION
140 SL=96:NL=5:GOSUB 9000
```

OUR LATEST 30 ISSUES

ISSUE #47, MAY 1986
CHRISTMAS LIST
BLACK HOLE
PITCHING MANAGER
SYMBOLIC DIFF.
BUG SPRAY
OWARE CAPTURE
EASY GRAPHICS
DESERT JOURNEY
SCREEN CONTROL
FULL ERROR MESSAGE

ISSUE #48, JUNE 1986
CHESTER
TV SCHEDULE
BASE RACE
ROMAN NUMERALS
ASTRO DODGE
HIRED AND FIRED
MULTI COPY
AUTO MATE
SCROLL PROJECT
NOISE GENERATOR

ISSUE #49, JULY 1986
COMPUTER I.O.U.
DISK DISASSEMBLER
BAKCHEK
PACHINKO
STOCK CHARTING
HAUNTED STAIRCASE
CANYON BOMBERS
DRAGONS 1 & 2
GRAPHIC SCROLL ROUTINE
AUTO BORDER

ISSUE #50, AUG. 1986
BUSINESS INVENTORY
D & D ARENA
DISK CLERK
PC SURVEY
TREASURE HUNT
SCREEN GENERATOR
ASTRO SMASH
NFL SCORES
BARN STORMING
SMASH GAME

ISSUE #51, SEPT. 1986
ASSET MANAGER
MONEY CHASE
FISHING CONTEST
RIP OFF
HAND OFF
BUDGET 51
VAN GAR
DOS EMULATOR
MEM DISK
VARIABLE REFERENCE

ISSUE #52, OCT. 1986
ACCOUNTS RECEIVABLE
WORKMATE SERIES
CALENDAR
INVASION
THE TRIP ADVENTURE
FOOT RACE
FLIPPY THE SEAL
SCREEN CALCULATOR
ABLE BUILDERS
SUPER ERROR2

ISSUE #53, NOV. 1986
CORE KILL
LUCKY MONEY
COOKIES ADVENTURE
NICE LIST
SPANISH QUIZZES
PAINT EDITOR
CARVERN CRUISER
SNAP SHOT
MEGA RACE
KICK GUY

ISSUE #54, DEC. 1986
JOB LOG
PEGS
DIGITAL SAMPLING
JUNGLE ADVENTURE
PAINT COCO 3
CONVERT 3
COMPUTER TYPE
PANZER TANKS
MRS PAC
BIG NUM

ISSUE #55, JAN. 1987
GRADE BOOK
MAIL LIST
DOWN HILL
FIRE FOX
JETS CONTROL
GALLOWS
DIR MANAGER
FIRE RUNNER
GRAPHICS BORDER
COSMIC RAYS

ISSUE #56, FEB. 1987
CALENDAR PRINT
CRUSH
GALACTA
OCEAN DIVER
CLUE SUSPECT
WORD EDITOR
ALIEN HUNT
DEMON'S CASTLE
PICTURE DRAW
DIG

ISSUE #57, MAR. 1987
THE BAKERY
ENCHANGED VALLEY ADV.
SAFE KEEPER
WAR 1
BOMB DISABLE
PIANO PLAYER
SPREAD SHEET
SLOT MANEUVER
LIVING MAZE
GEM SEARCH

ISSUE #58, APRIL 1987
ACCOUNTS PAYABLE
PRINTER GRAPHICS
SIMON
PANELING HELPER
MULTI CAKES
CAR RACE
ELECTRONICS I
BATTLE TANK
DISKETTE VERIFY
WEIRDO

ISSUE #59, MAY 1987
GENEOLOGY
HOME PLANT SELECTION
CHECK WRITER
HELIRESCUE
KABOOM
NEW PONG
CROQUET
FUNCTION KEYS
ZOOM
ELECTRONICS 2

ISSUE #60, JUNE 1987
JOB COSTING
LABELS
CATCH A CAKE
COCO MATCH
ROBOTS
STREET RACERS
BOWLING 3
ELECTRONICS 3
GRAFIX
KRON

ISSUE #61, JULY 1987
EZ ORDER
SUBMISSION WRITER
KEYS ADVENTURE
WALLPAPER
CHOPPER COMMAND
UNDERSTANDING OPPOSITES
BIT CODE PLOTTING
ELECTRONICS 4
KING PEDE
RAIDER

ISSUE #62, AUG. 1987
PENSION MANAGEMENT
HERB GROWING
CATOLOGER UTILITY
RAIDERS
ALPHABETIZING
U.F.O.
ELECTRONICS 5
RAMBO ADVENTURE
BLOCKS
MULTI SCREEN CAVES

ISSUE #63, SEPT. 1987
GENEOLOGIST HELPER
SMART COPY
MAINTENANCE REPORTING
COCO3-COCO 2 HELPER
DIRECTORY PICTURE
SUB ATTACK
SAVE THE MAIDEN
CAVIATOR
ELECTRONICS 6
MONKEY SHINE

ISSUE #64, OCT. 1987
GARDEN PLANTS
FORT KNOX
ELECTRONICS FORMULAS
SNAKE IN THE GRASS
CYCLE JUMP
GEOMETRY TUTOR
WIZARD
GAME OF LIFE
ELECTRONICS 7
FLIGHT SIMULATOR

ISSUE #65, NOV. 1987
TAXMAN
DAISY WHEEL PICTURES
CHILDSTONE ADVENTURE
SIR EGGBERT
CROWN QUEST
GYM KHANA
COCO 3 DRAWER
FOOTBALL
ELECTRONICS 8
CHOP

ISSUE #66, DEC. 1987
ONE ROOM ADVENTURE
OS9 TUTORIAL
RIVER CAPTAIN
SOUND EFFECTS
BETTING POOL
ADVANCE
MATH TABLES
ELECTRONICS 9
LOWER TO UPPER
NOIDS

ISSUE #67, JAN. 1988
AUDIO LIBRARY
SAVE THE EARTH
WEIGHTS AND MEASURES
LOW RES PICTURES
WORD COUNTER
BACARAT
BATTLE SHIP
ELECTRONICS 10
TAPE CONVENIENCE
PENQUIN

ISSUE #68, FEB. 1988
COINFILE
WORD COUNTER
SQUIRREL ADVENTURE
AREA CODES
DRAW POKER
TURTLE RACES
ELECTRONICS 11
MULTI SCREEN
CANON PRINT
COCO TENNIS

ISSUE #69, MAR. 1988
POLICE CADET
STAMP COLLECTION
BARRACKS ADVENTURE
CITY/TIME
HI-LO/CRAPS
OLYMPICS
HI-RES CHESS
ELECTRONICS 12
DOUBLE EDITOR
DOUBLE BREAKOUT

ISSUE #70, APRIL 1988
BLOTTO DICE
SUPER COM
GENESIS ADVENTURE
PLANETS
PHK/WAR
SIGN LANGUAGE
ARX SHOOTOUT
ELECTRONICS 13
MAGIC KEY
SNAP PRINT

ISSUE #71, MAY 1988
SUPER LOTTO
ROBOT ADVENTURE
MAZE
YAHTZEE 3
PHASER
SHAPES & PLATES
STAR WARS
ELECTRONICS 14
PRINTER CONTROL
MAZE 2

ISSUE #72, JUNE 1988
MARKET WATCHER
THREE STOOGES
HOSTAGE
PROGRAM TRIO
GLADIATOR
US & CAN QUIZ
JEOPARDY
ELECTRONICS 15
COCO 3 PRINT
CTTY COMMUNICATOR

ISSUE #73, JULY 1988
FOREIGN OBJECTS
CHESS FUNDAMENTALS
WATERFOWL QUIZ
WHAMMY 3
ADVENTURE TUTORIAL
CIRCLE 3
EDUCATIONAL TRIO
WRITE-UP EDITOR
PICTURE PACKER
AIR ATTACK

ISSUE #74, AUGUST 1988
VIDEO CATALOG 3
ONE EYE WILLIE
JAVA
GAME TRIO
CRIONAUT WARRIOR
ENVELOPE PRINT
RAM DRIVE 3
MODE 2 UTILITY
XMODEM TRANSFER
CAVE II

ISSUE #75, SEPT. 1988
DRACULA HUNT
HELP TRIO
SHOWDOWN DICE
TARZAR 1 ADVENTURE
ARAKNON
CASHFLOW REPORTING
GRAPHIC LETTER
GRAPHIC EDITOR
ADDRESS BOOK
SQUARES

ISSUE #76, OCT. 1988
SUPER BLITZ 3
CHAMBERS
TRIO RACE
EARTH TROOPER
STARGATE
BOWLING SCORE KEEP
JOYSTICK TO KEYBOARD
KEYBOARD TO JOYSTICK
DISK TUTORIAL
SAILORMAN

EACH ISSUE CONTAINS 10 PROGRAMS READY TO LOAD. AVAILABLE ON TAPE OR DISK. SEE NOVEMBER '88 RAINBOW FOR EARLIER ISSUES.

VISA

MasterCard

RAINBOW
CERTIFICATION SEAL

SUPER SAVINGS

SINGLE ISSUE	$8.00
2-5 ISSUES	$6.00 EA
6-10 ISSUES	$5.00 EA
11 OR MORE ISSUES	$4.50 EA
ALL 76 ISSUES	$199.00

PURCHASE 20 OR MORE ISSUES AND RECEIVE A FREE 6 MONTH SUBSCRIPTION

COCO I, II, and III

- ★ **All Programs Include Documentation.**
- ★ **We Send 1st Class— No Charge!**
- ★ **For Information on Subscription Prices Turn to Page 153**

MAIL TO

T&D SUBSCRIPTION SOFTWARE
2490 MILES STANDISH DR.
HOLLAND, MI 49424
(616) 399-9648

NAME ______________________

ADDRESS ______________________

CITY ______________________

STATE ______________ ZIP ______

CREDIT CARD # ______________________

TOTAL AMOUNT ______________________

CIRCLE ISSUES DESIRED

1	9	17	25	33	41	49	57	65	73
2	10	18	26	34	42	50	58	66	74
3	11	19	27	35	43	51	59	67	75
4	12	20	28	36	44	52	60	68	76
5	13	21	29	37	45	53	61	69	
6	14	22	30	38	46	54	62	70	
7	15	23	31	39	47	55	63	71	
8	16	24	32	40	48	56	64	72	

PLEASE CIRCLE
TAPE OR DISK

Enter Listing 4 and try to fool the *subroutine* by entering incorrect information. The subroutine is only 15 lines long, but it does everything we need. It displays a line of instructions at the screen position we specify (9020), telling us what we should be typing in next. Then it accepts our data on the next line (9026), checks it to see that it is within the range of values (9038, 9040, 9046) or length (9032) we are looking for, and demands that we type it in again if it is not an acceptable response.

If you look at the program statements before `GOSUB 9020`, you will see that I placed setup values in the variables `P$`, `VT$`, `LV`, `HV` and `SL` before calling the subroutine. These values are used by the subroutine to direct its actions. They are used as follows:

`P$`	The line of instructions. It should be 32 characters or less in length.
`SL`	The position we want to start the display of the line of instructions. It should be a multiple of 32.
`VT$`	The variable type — `N` is for a number without decimals; `D`, for a decimal number with two decimal places; and `A`, for alpha-numeric information.
`LV`	The lowest acceptable value.
`HV`	The highest acceptable value, or maximum length for `VT$=A`.

We used the `LINE INPUT` instruction (Line 9026) to get our information from the keyboard. The `LINE INPUT` instruction lets us enter commas, semicolons or special characters that might cause the `INPUT` statement trouble.

Try writing your own program using the subroutine to enter something with which you are familiar, such as your telephone number. You can test for a specific number by setting both `HV` and `LV` to that number before calling the subroutine. This subroutine will be used in our database's front-end to make sure that no unwanted information is accepted.

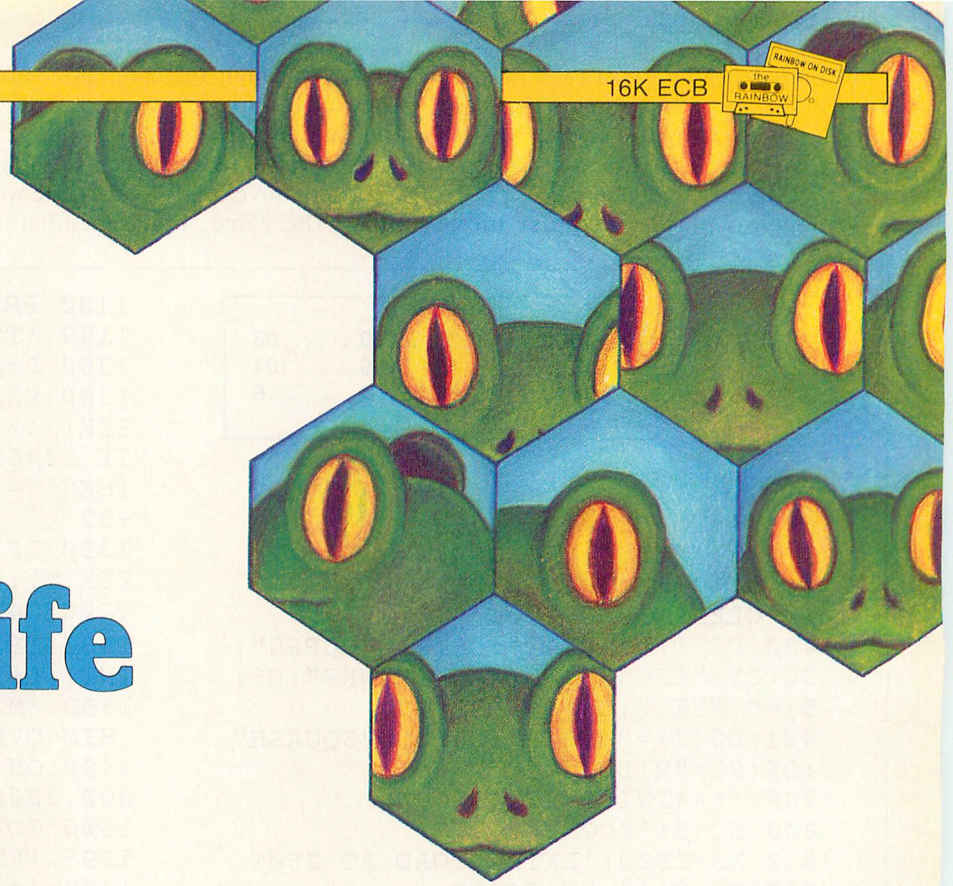
That's all for this month. It will take some time to get our database set up, but don't give up. Next time we'll set up a *Money Manager* database and create menus and data inputs to do this.

(Questions or comments about this tutorial may be directed to the author at 83-34 169 Street, Jamaica, NY 11432. Please include an SASE when requesting a reply.)

```
142 ON A GOTO 150,300,144,146,148
144 PRINT @320,"OPTION #3  DELETE WAS CHOSEN":GOTO 130
146 PRINT @320,"OPTION #4  REPORT WAS CHOSEN":GOTO 130
148 END
150 CLS0:PRINT "---- ADDING A MARBLE ----
152 LI$(1)="1= SIZE OF THE MARBLE
153 LI$(2)="2= COLOR OF THE MARBLE
154 LI$(3)="3= DESCRIPTION OF THE MARBLE
155 LI$(4)="4= RETURN TO THE PREVIOUS MENU
160 SL =96:NL=4:GOSUB 9000
162 ON A GOTO 170,170,170,120
170 PRINT @320,A;" CHOSEN":GOTO 152
300 CLS0:PRINT "- CHANGE EXISTING INFORMATION -
302 LI$(1)="1= CHANGE THE SIZE
304 LI$(2)="2= CHANGE THE COLOR
306 LI$(3)="3. CHANGE THE DESCRIPTION
308 LI$(4)="4. RETURN TO PREVIOUS MENU"
310 SL=64:NL=4:GOSUB 9000
314 ON A GOTO 320,320,320,120
320 PRINT @320,A;" CHOSEN":GOTO 302
9000 FOR I= 1 TO NL:PRINT @SL,LI$(I)
9001 SL= SL+32:NEXT I
9005 PRINT @32,"*   SELECT FROM THE FOLLOWING"
9006 FOR I = 1 TO 200
9007 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9008 PRINT @32," ":FOR I = 1 TO 65
9009 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9010 GOTO 9005
9012 A = VAL(A$):IF A > 0 AND A < NL+1 THEN RETURN
9113 GOTO 9005
```

Listing 4: `MARBLE2`

```
 100 CLEAR 500
 105 CLS
 110 P$="ENTER A NUMBER FROM 1 TO 99":VT$="N"
 120 HV=99:LV=1:SL=64:GOSUB 9020
 130 P$="ENTER MARBLE SIZE: 0.25 TO 5.50":VT$="D"
 140 HV=5.50:LV=0.25:SL=128:GOSUB 9020
 150 P$="MARBLE DESCRIPTION < 32 CHARS":VT$="A"
 160 HV=32:SL=192:GOSUB 9020
 170 GOTO 105
 9020 PRINT @SL,P$ 'PROMPT FOR VARIABLE
 9022 PRINT @SL+32," " 'CLEAR THE NEXT LINE
 9024 PRINT @SL+32,""; 'REPOSITION CURSOR
 9026 LINE INPUT "==> ";VA$ 'INPUT THE VARIABLE
 9028 LA= LEN(VA$):IF VT$ = "D" GOTO 9044
 9030 IF VT$ = "N" GOTO 9036
 9032 IF LA > INT(HV) GOTO 9020
 9034 RETURN 'VARIABLE IS IN RANGE
 9036 VV= VAL(VA$) 'GET NUMERIC VALUE
 9038 IF VV < LV GOTO 9020
 9040 IF VV > HV GOTO 9020
 9042 GOTO 9034
 9044 IF LA > 9 OR LA < 3 GOTO 9020
 9046 IF MID$(VA$,LA-2,1) <> "." GOTO 9020
 9048 GOTO 9036
```



Some days it doesn't pay to leave the lily pad

It's a Toad's Life

By Christopher Dunn

Are your fingers cramped from entering page after page of listings, or have you just looked in horror at the length of most entertaining programs? If so, I have a game for you. *Toader* needs your help to return to the lily pads. With the help of a 16K ECB CoCo and one joystick, you can give this poor little toad the guidance it needs.

Use the joystick to guide *Toader* to its home at the top of the screen. You must avoid cars and trucks on the road and get your toad across the water by making him hop on the floating logs and swimming turtles. Once there is a toad on each of the five lily pads at the top of the screen, you'll advance to a more challenging level. Be careful with your little friend. You start with only three toads at the bottom of the screen. You've also got to keep an eye on the timer. *Toader* only has so much time to get home before he croaks.

You may not believe that a short program can do all this. However, using one of BASIC's better tricks (string manipulation), you can create a *short* program that's fun. BASIC is an interpreted language. When a line is executed, the interpreter must translate what it sees before following the instruction — a slow process. Strings offer a way around this repeated interpretation. When the computer locates a string, the entire line is interpreted once. However, an assembly language routine generates a string's characters (which are stored as consecutive bytes in an area of RAM located by a string pointer) in a fraction of the time required to print each character separately in BASIC.

Toader uses this idea to draw the rows of cars, logs and turtles. Each row is assigned a 60-character string. As a pointer (`P`) counts from one to 30, a 30-character portion of each string is printed using the `MID$` function. You can make a row appear to move backwards by using `32-P` as the pointer value.

The rows are printed beginning at Line 1049. Notice the inclusion of `P*2` in Line 1120. This instruction makes the pointer move twice as fast, which in turn makes the row move twice as fast as the others. Initially, this row consist only of ASCII code 143 (grass for our toad). However, cars materialize at Level 3. (In fact, several challenges become apparent beyond Level 1. Watch for them.)

A timer at the bottom of the screen serves both to warn you of *Toader*'s impending demise and to record the score. The equation for increasing the score is in Line 3005. Line 1350 includes a sound for our toad's jump; however, I have masked that line with a `REM` statement to increase program speed and joystick responsiveness. Try the program with the sound and make any modifications you want. (I am no Mozart, and I'd be happy to learn that someone has come up with a better tune for the `PLAY` statements.)

The `DATA` statements at the end contain the information for the logs, cars and turtles (Logs = `255`, Turtles = `42`, and Cars = `175`, `207` and `223`). While only the given character codes are available, you might try experimenting with the width of each obstacle (up to `30`) and the space between them. Since the obstacles are placed randomly within the intervals (see Line 2112), the value simply identifies at what section of the row the obstacle will appear.

The `EXEC` statement, Line 1300, is the `JOYIN` routine listed in the Color Computer manual (`JOYIN=[A00A]`). Check this number by peeking addresses &HA00A and &HA00B. You should find the values 169 and 222 [(169*26)+222=43486]. If the values you find at these addresses are different, multiply the first value by 256 and add that total to the second value. That will be your `EXEC` address. Be careful with this equation. If you `EXEC` the wrong address, the computer may freeze. I suggest that you save the program before running it.

Christopher Dunn is a 19-year-old college freshman who attends the California Institute of Technology.

You are given an extra toad at 2500 points. Variable `XS` represents the score at which an extra toad is awarded. After you receive the first toad, `XS` will become 7500, then 15,000, etc.

When you play, you must move quickly through the cars. (Remember: They move at twice the speed of the logs and turtles.) However, crossing the water requires more concentration than speed, so move carefully over the water. Enjoy the game, but remember that *Toader*'s life depends on you.

(Questions or comments about this program may be directed to the author at Lloyd House, I-54 Cal Tech, Pasadena, CA 91126. Include an SASE when requesting a reply.) ☐

1000	236	2290	83
1350	85	3006	104
2110	55	END	6

The Listing: TOADER

```
0 '***TOADER***
1 '**(ALMOST FROGGER)**
2 'BY CHRISTOPHER DUNN
10 CLEAR 1000
400 D$(1)="SPLAT":D$(2)="OOPPS":
D$(3)="CROAK":D$(4)="THANKS":D$(
5)=" BYE ":D$(6)="HELP"
401 D$(7)="WHOMP":D$(8)="SQUASH"
:D$(9)="RIBBIT"
700 '***INITIALIZATION
800 SC=0:'SCORE
810 XS=2500:'EXTRA TOAD AT 2500
820 NT=3:'# OF TOADS
830 ST=32:'START TIMER VALUE
840 LV=1:'GAME LEVEL
899 '***NEW SCREEN
900 GOSUB 2100:GOSUB 2200
950 P=RND(30):'OBSTACLE SHIFT
951 T=1424:'TOAD POS. (POKE)
952 T0=1424:'LAST TOAD POS.
953 L=143:'LAST VAL(UNDER TOAD)
954 NL=5:'# OF LILLY PADS LEFT
955 TM=ST:'TIMER
960 PRINT@480,STRING$(TM-1,191);
970 PRINT@448,STRING$(16,143);:P
RINT@448,"LEVEL";LV;:GOSUB2310
980 GOSUB 2300
995 PLAY"O3T3L8CL16EL4E#L8D#L16F
L8GL4FT2"
999 '***BEGINNING OF MAIN LOOP
1000 P=P+1:IF P>30THEN P=1
1010 TM=TM-.5:IF TM<=0THEN2000
1020 POKE1504+TM,128
1040 POKE T,L
1049 'LOGS, CARS, TURTLES
1050 PRINT@65,MID$(A$(0),P,30);
1060 PRINT@97,MID$(A$(1),32-P,30
);
1070 PRINT@129,MID$(A$(2),P,30);
1080 PRINT@161,MID$(A$(3),32-P,3
0);
1090 PRINT@257,MID$(A$(4),32-P,3
0);
1100 PRINT@289,MID$(A$(5),P,30);
1110 PRINT@321,MID$(A$(6),32-P,3
0);
1120 PRINT@353,MID$(A$(7),P*2,30
);
1130 PRINT@193,MID$(A$(8),P,30);
1199 'TOAD MOVEMENT
1200 L=PEEK(T):T0=T:POKE T,159
1300 EXEC43486:J0=PEEK(346):J1=P
EEK(347):IF J0=0 THEN T=T-1 ELSE
IF J0=63 THEN T=T+1 ELSEIF J1=0
THEN T=T-32ELSEIF J1=63 THEN T=T
+32
1350 IF T0<>T THEN POKE T0,L:L=P
EEK(T):POKE T,159:REM PLAY"L70O3
V20CEO4V30FA"
1360 IF L=106 THEN L1=9 ELSE L1=
INT((L-127)/16)
1399 'MOVES TOAD ON LOGS OR RUNS
 HIM OVER WITH CAR
1400 ON L1 GOTO 1500,2000,2000,3
000,2000,2000,2090,2050,2060
1500 GOTO 1000
1995 'END OF MAIN LOOP
1999 '***CRUSHED TOAD
2000 PRINT@493,D$(RND(9));:PLAY"
O1V20L8GL20V25FL4V30D":POKE T,L
2020 NT=NT-1:IF NT=0THEN4000
2022 TM=ST:PRINT@480,STRING$(TM-
1,191);
2025 GOSUB 2300
2030 L=143:T=1424
2035 GOSUB 2310
2040 GOTO 1000
2049 '***MOVE TOAD
2050 T=T-1:L=PEEK(T):GOTO1500
2060 T=T+1:L=PEEK(T):GOTO1500
2090 POKE T,L:T=T-32:L=143:GOTO
1500
2099 '***SET UP OBSTACLES
2100 FOR Q=0TO3
2101 A$(Q)=STRING$(30,175):A$(Q+
4)=STRING$(30,128):NEXT Q
2105 A$(8)=STRING$(30,175)
2110 FOR Q=0TO8:READ A,B,C
2111 A$=STRING$(B,A)
2112 FOR QQ=1 TO 30 STEP C:MID$(
A$(Q),QQ+RND(1+C-B)-1,B)=A$
2113 NEXT QQ,Q
2120 IF LV=3 THEN A$(7)=STRING$(
6,175)+STRING$(24,128) ELSEIF LV
<3 THEN A$(7)=STRING$(30,143)
2125 IF LV=1 THEN A$(8)=STRING$(
30,143)
2127 FOR Q=0 TO 8:A$(Q)=A$(Q)+A$
(Q):NEXT Q
2128 A$(7)=A$(7)+A$(7)
2130 RESTORE
2140 RETURN
2199 '***DRAW SCREEN
```

```
2200 FOR Q=1 TO 16:PRINT@480,STR
ING$(32,128);:NEXTQ
2201 CLS 0
2202 PRINT@0,STRING$(64,207);
2203 PRINT@64,STRING$(192,175);
2210 FOR Q=33 TO 61 STEP 7:PRINT
@Q,CHR$(191);CHR$(191);:NEXTQ
2220 PRINT@224,STRING$(32,143);
2230 PRINT@384,STRING$(32,143);
2240 PRINT@416,STRING$(32,239);
2250 FOR Q=2 TO 12:PRINT@Q*32,CH
R$(207);:PRINT@Q*32+31,CHR$(207)
;:NEXTQ
2290 RETURN
2299 '***SHOW # OF TOADS
2300 GOSUB 2305:PRINT@463,STRING
$(14,128);
2301 IF NT<=1 THEN RETURN ELSE F
OR Q= 464 TO 464+(NT-2)*2 STEP 2
:POKE Q+1024,159:NEXT Q:RETURN
2305 IF NT>8 THEN NT=8
2307 RETURN
2309 '***SHOW SCORE/EXTRA TOAD?
2310 SC=INT(SC):PRINT@455,USING"
###,### ";SC;
2311 IF SC>=XS THEN PLAY"V31O4L2
0GP10GP10G":XS=XS+2*SQR(XS*1340)
+1340:NT=NT+1:GOSUB 2300
2315 RETURN
2999 '***TOAD IN LILLY PAD!!!
3000 POKE T,159:IF PEEK(T-1)=191
THEN POKE T-1,159 ELSE POKE T+1
,159
3005 SC=SC + TM*TM*LV + 100*LV
3006 TM=ST:PRINT@480,STRING$(TM-
1,191);
3007 GOSUB 2310
3009 PLAY"T7O3V25L6FL4EV15L10AV2
0L4GT2"
3010 NL=NL-1:IF NL=0 THEN 3200
3050 T=1424:L=143:GOTO 1500
3199 '***GO TO NEXT LEVEL
3200 ST=ST-1:IF ST<=18 THEN ST=1
8
3205 LV=LV+1
3210 GOTO 900
3999 '***END OF GAME(OF COURSE)
4000 PRINT@225,"          GAME
OVER          ";
4010 FOR Q=1 TO 2000:NEXT Q:GOTO
 700
8998 '***OBSTACLE DATA
8999 'ASCII,WIDTH,SEPARATION
9000 DATA 255,6,15
9010 DATA 42,3,10
9020 DATA 255,8,15
9030 DATA 42,3,6
9040 DATA 207,4,10
9050 DATA 175,2,6
9060 DATA 223,3,10
9070 DATA 175,5,10
9080 DATA 255,5,10
```

If you write checks, use credit cards, have a bank account or pay taxes, then....

You Need CoCo-Accountant III

NEW for the CoCo 3

Since 1983, **CoCo-Accountant** has been leading the pack in home and small business financial programs for the Color Computer. Now we've made it even better, with a brand new **CoCo-Accountant** just for the **Color Computer 3.** Take advantage of all the new machine has to offer in a program that will make managing your money a snap!

CoCo-Accountant III answers the big three questions we all have about our finances: Where did the money come from? Where did it go? And what can I deduct from my taxes?

CoCo-Accountant III doesn't require any knowledge of accounting. It's a single-entry system that thinks the way you do. Just set up a list of accounts and start entering your transactions. Checks, credit cards, cash receipts, payroll stubs, electronic fund transfers, whatever. You toss it in and **CoCo-Accountant** sorts it out. Here's what **CoCo-Accountant** does:

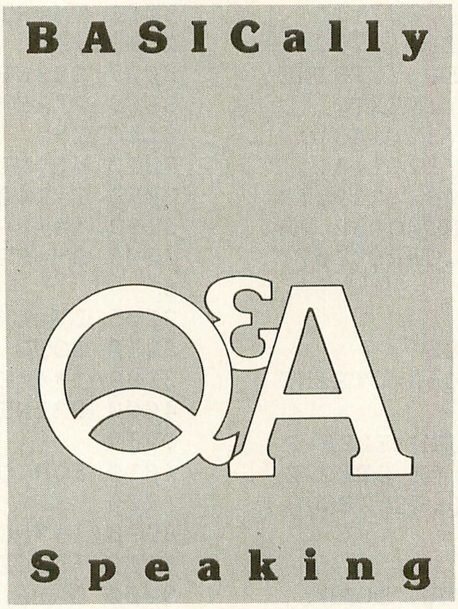
- Lists and totals all transactions for any calendar period.
- Lists and totals transactions by account, payee or income source for any calendar period.
- Instant account and monthly summaries with net cash flow.
- Tracks, lists and totals deductible expenses.
- Tracks uncleared checks and balances your checkbook. Makes that monthly chore a breeze!
- Produces a printed spreadsheet showing transactions by month and account for the whole year! Seeing this one is believing.

CoCo-Accountant III stores up to 2,000 transactions and 72 accounts (depending on disk space). Almost every feature has been improved. It will run on any CoCo 3 with a disk drive. And best yet, it's only **$39.95.**

You say you don't have a CoCo 3? You can still order our best-selling CoCo-Accountant II with many of these features for only $34.95.

Join our list of satisfied customers who say **CoCo-Accountant** is the most useful program they own! Send check, money order or **VISA/MasterCard** information to the address below, or call our handy, **toll-free order line.**

Federal Hill Software
8134 Scotts Level Road
Baltimore, Md. 21208
301-521-4886
Toll-free Orders 800-628-2828 Ext. 850



By Bill Bernico
Rainbow Contributing Editor

Locating Typos

Dear Bill:

My wife and I typed in the program Big Bad Wolf *from the September '88 issue (Page 34), and we can't get it to run. Every time we type* `RUN`, *all we see is the small figure of the pig and the wolf being drawn. After that, the screen goes blank and the OK prompt appears. How can we get this to run properly?*

Warren & Jean Schulze
Manitowoc, Wisconsin

I looked at the listing, and I'd like to share a few hints with you. These hints will save you some frustration and time looking for your typos. Even when you think you typed in each line correctly, very small mistakes can creep in. It takes only one typographical error to crash the program with a syntax error.

In this particular case, the author has added an error trap routine in Line 20, which says `ON ERR GOTO 2290`. That's a new feature for the CoCo 3, and while it may have its advantages in the finished product, it will not help you find your typos while you are in the debugging process. As a matter of fact, if your error is caused by a typographical error and you try to run the program with that error in place, the `ON ERR GOTO` routine will simply end the program without telling you *where* the error occurred.

To temporarily remedy this condition, you'll need to by-pass that routine. You can either omit Line 20, replacing it after you have a working copy, or you can edit Line 20 and place an apostrophe (SHIFT-7) in front of the line, rendering it useless. Just remember to remove the apostrophe or replace the line when you are finished de-bugging.

When Line 20 is deactivated, you can run your program. Now, when the program encounters an error, it will halt, and the error will appear along with the line number. In your particular case, you not only omitted the comma between `PSET` and `BF` in Line 1360, but you also had a 2 at the end of Line 2220. That probably resulted from not shifting the 2 key to get your closing quote. Now that you can see where the errors have occurred and can correct them, try running the program again. When it works the way the author says it is supposed to, you can replace Line 20 or remove the apostrophe. Then you'll be ready to enjoy the program.

Out of Range

Dear Bill:

I have a 64K CoCo 2 Model 26-3127 with a cassette system. I have had it for almost four years, but now it won't accept `GET/PUT` *statements. Every time I try to use* `GET/PUT`, *I get a BS Error. Why has this happened, and how can I fix it?*

Bill Cathey
Kings Mountain, North Carolina

I don't think your machine is at fault, Bill. If it is, you'll have to take it to Radio Shack for a checkup. If you have a program that will run a check on your system, you could help the technician locate the problem.

If, on the other hand, your problem is in your programming, maybe I can help. To begin with, a BS Error means that you have a *Bad Subscript*, or a subscript *out of range*. In other words, you have to use a subscripted variable to define the areas to be used in the `GET` and `PUT` commands. Suppose you are trying to move a part of the graphics screen 15-by-15 pixels in area. That graphics area will be stored in a subscripted array, which we will call Array `G$`. In this case, `G$` must be dimensioned early in the program. As you may remember, any subscripted variable larger than nine must be dimensioned. If you didn't allot enough space for Array `G$`, you'll get a BS Error.

Type in this short sample program and run it:

```
10 PMODE 4,1:PCLS 1
20 SCREEN 1,1:COLOR 0,1
30 DIM G(10)
40 DRAW''BM10,10R15NG15D15L15U1
5F15
50 GET (10,10)-(25,25),G
60 FOR X1 TO 750:NEXT X
70 PCLS1
80 PUT (100,100)-(115,115),G
90 GOTO 90
```

If this program works, the problem is not in your machine. However, if this sample produces a BS Error, you may have other subscripted variables in your program that have nothing to do with `GET` and `PUT`. The program may be crashing in another area altogether.

Fading Away

Dear Bill:

I'm writing a CoCo 3 program in `BASIC` *using* `HSCREEN 2` *and* `HPRINT` *statements to display my instructions on the graphics screen. The way the screen is set up, I have to use the last line for text, so one of my commands looks like this:*

```
HPRINT (1,23), "Instructions"
```

I have problems when there are letters with descenders (g, p, q, y) on this line. The descending part of the letter fades into the black border, and it's difficult to read at a glance. Any solutions?

Eddie Lewis
Lockport, Illinois

There is a simple fix that will let you read that last line easily and clearly. All you have to do is make the surrounding border color the same as the rest of your text screen. For my example, I'll use black letters on a white background. To get this, I use the following:

```
HSCREEN 2:HCLS 4:HCOLOR 8,4
```

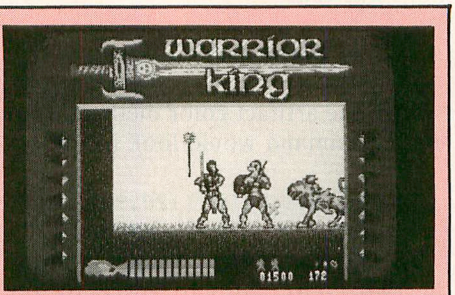
Color 8 is black and Color 4 is white.

With these values, my white screen

Bill Bernico, RAINBOW*'s newest columnist, is the author of more than 300 Color Computer programs. He founded Bill Bernico Software in 1987 and enjoys writing and recording his own music.*

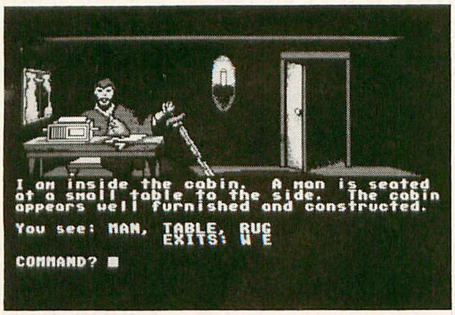
SUNDOG SYSTEMS

Warrior King



Become RASTANN, Warrior King, on the quest to regain his rightful crown, hidden deep within a sinister land. Battle monsters, gain magic and weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. From the creator of *Kung-Fu Dude* comes this awesome arcade game for the CoCo III! *Warrior King* uses the most detailed 320x200 16 color graphics and high speed machine code to vault you into a world of fantasy. Dare ye challenge the many perils ahead in order to become WARRIOR KING? Req. 128K CoCo III, disk drive, and joystick. Only $29.95.

In Quest of the Star★Lord



```
I am inside the cabin.  A man is seated
at a small table to the side.  The cabin
appears well furnished and constructed.

You see: MAN, TABLE, RUG
         EXITS: W E

COMMAND? ■
```

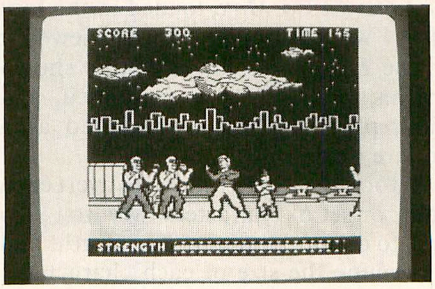
This is THE graphic adventure for the CoCo III! Unparalleled 320x200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. *In Quest of the Star Lord* is a full 4 disk sides of mind-numbing adventure! Req. 128K CoCo III and disk drive. Only $34.95. Hint Sheet: $3.95.

"A dynamite program! The best graphics I've seen to date on the CoCo III. You have to see it to believe it."
— 8/88 Rainbow review

Kung-Fu Dude

An exciting arcade game. The BEST karate game ever created for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective. Spectacular graphics, sound effects, and animation! Req. 64K CoCo, disk drive, and joystick. Only $24.95.

"The CoCo karate gap has been filled and Kung-Fu Dude *does it excellently. I highly recommend it!"*
— 2/88 Rainbow review



All programs CoCo 1, 2, 3 compatible, unless otherwise stated

Sundog Systems
21 Edinburg Drive
Pittsburgh, PA 15235
(412) 372-5674

HALL of the KING
TRILOGY

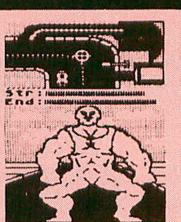
The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available! A total of six disks of intense graphic adventure will have you playing for weeks! Each section is a two-disk stand alone adventure, but all three together form an epic saga. Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for $29.95, the lowest price ever, or you can purchase the entire set for only $74.95! Req. 64K CoCo and disk drive.

"One of the best adventures I have experienced to date!" — *6/86 Rainbow review*

"The animated graphics are dramatic, detailed, and excellent!" — *11/87 Rainbow review*

"The adventure of a lifetime. Don't miss out!"
— *7/88 Gamer's Connection review*

CHAMPION



Become a superhero in this unique 64K action adventure. Great graphics and sound effects! See 5/87 Rainbow review. Disk $19.95.

DRAGONBLADE

Another great 64K animated adventure! Can you obtain the enchanted sword to slay the evil dragon? See 11/86 Rainbow review. Disk $19.95.

DRAGONBLADE

WHITE FIRE OF ETERNITY

Enter the era of monsters and magic in this splendid 64K animated adventure! See 12/86 Rainbow review. Disk $19.95.

Personal checks, money orders, and American C.O.D. orders accepted. Include $2.50 for S/H. $3.00 extra for C.O.D. orders. PA residents add 6% sales tax. Authorship and dealer inquires welcome.

will have a black border unless I change it by poking a value to make the border the same color as the rest of the screen. For a white border, I will want to poke a value of 63 (the palette color for white) into Location 65434. Your best bet is to include this poke in the same line with your other graphics screen commands, immediately after `HCOLOR 8,4`.

If your graphics screen color is anything other than white, simply change the poke value to match the color you're using. For example, if your graphics screen is blue and you're using white letters, poke Location 65434 with 9, since 9 is the palette value for that shade of blue. Your other graphics commands would be `HSCREEN 2:HCLS 2:HCOLOR 4,2`. Now you will have a completely blue screen with white letters.

The Old Red, White and Blue

Dear Bill:

I've seen procedures that create the artifact colors red and blue on a `PMODE 4` *screen by poking* `178` *with either a 1 for red or a 2 for blue. Is there a way to get these colors without poking these values?*

Jeff Gatzke
Glendale, California

There is another way to get these colors on the `PMODE 4` screen; however, this technique depends on which lines are being drawn on the screen. That is, if you draw lines on an even-numbered coordinate, you'll get one color — provided that your series of lines is spaced two lines apart. The artifacting appears when these two lines are next to each other without touching. When you draw on the odd coordinates, you'll get the other color. The color you get will vary each time because your computer may not default to the right color set when you power up.

When you overlap these lines, you get white if you start on a black screen. When you run the program shown in the listing you will see three colors — red, white and blue. The red is produced by the series of lines drawn on the even coordinates and drawn on every other line. The blue is produced when the lines are drawn at odd coordinates and drawn on every other line. The shite in the middle is produced when the lines are drawn right next to each other.

This method is limited because you may want to fill odd-shaped areas. While you could draw lines within your area, it would be tedious and a waste of time. Using the `POKE 178,1` method with your `PAINT` command would be more efficient and space saving. Just remember that a regular `PAINT` command looks like this:

```
PAINT (128,96),1,1
```

With the artifact color method, your `PAINT` command would look like this:

```
POKE 178,1:PAINT (128,96),,0
```

The regular `PAINT` command shows the two coordinates followed by the paint color, a comma and the border color. The artifact method has two commas followed by a zero instead.

The Listing:

```
10 PMODE4,1:PCLS:SCREEN1,1
20 FORX=1TO250STEP2
30 LINE(2+X,2)-(2+X,115),PSET
40 LINE(3+X,75)-(3+X,189),PSET
50 NEXT X
60 GOTO60
```

Creations Font

Dear Bill:

I enjoyed your English Font *program in the May '88 issue ("Ye Olde Font," Page 36). I even ordered your disk with the other dozen or so fonts on it. They are all well done, but I'd like to know how you knew where to* `DRAW` *each character to get it to look like it does. How do you visualize what each character will look like before you define it, and how can I convert some of my* CoCo Max *fonts to* BASIC *strings?*

Chuck Dobbs
Fayette, Alabama

It's funny that you mention the *CoCo Max* fonts. My fonts were created in BASIC using those fonts as a basis. That is, I ran *CoCo Max*, loaded in the font that I wanted to convert and viewed it in the *Fat Bits* mode. A picture shown in this mode screen is magnified, and each pixel is then represented as a square on a grid.

It took me a long time to convert each font, or set of characters. My first step was to count the squares in the grid and determine the size of each character. I decided to start each character at the upper left-hand corner of that grid and end at the upper right-hand corner. That way, when a character needed to be displayed on the screen, its position would line up with the next character.

Starting at that upper left-hand corner, I looked over the character, which was now represented by a series of filled in squares, and determined my shortest route for covering the entire character in as few steps as possible. For example, if the letter A took up an area 8-by-8 squares in dimension, I would enter the following:

```
A$(65)="BRND8R5D4NL5D4U8BR2"
```

Since there are 90 possible `A$` combinations (32 through 122), each character must be defined in its own subscripted variable. A capital letter A has an ASCII value of 65, so that draw string is stored in `A$(65)`. A capital letter B would be stored in `A$(66)`, and so on until you have defined each character with its own variable.

With all the characters defined, you can place them on the graphics screen by drawing the string containing that particular letter. For example, the following command line:

```
DRAW"BM10,10"+A$(65)+A$(66)+A$(67)
```

will result in the appearance of "ABC" on the graphics screen at Location 10 across and 10 down. Knowing that each letter is 8-by-8 squares, you can space your lines 10 pixels apart and be able to display 19 lines of text on a `PMODE 4` screen.

Saving Graphics

Dear Bill:

I used `DRAW` *statements to create a* `PMODE 4` *picture. How can I save this to disk for later use?*

Vic Roberts
Lexington, Kentucky

Once your BASIC program is finished with your `PMODE 4` masterpiece, save the picture to disk by entering `SAVEM"`*filename*`",&H0E00,&H25FF,&HA027`. This assumes your picture was created using `PMODE 4,1`. Save the picture to tape by entering `CSAVEM"`*filename*`",&H0600,&H1DFF,&HA027`. To view your creation, (`C`)`LOADM` it and run the following program:

```
10 PMODE4,1
20 SCREEN 1,1
30 GOTO 30
```

Questions about specific BASIC programming problems can be addressed to BASICally Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. We are unable to answer letters individually.

Radio Shack Has the Best in Color Computer Software.

DeskMate 3
SHANGHAI
WHERE IN THE WORLD IS CARMEN SANDIEGO?
Flight Simulator II
CHEXDER
King's Quest III
To Heir is Human
HOME PUBLISHER
Personal Finance
TETPИC (TETRIS)
Rad Warrior
COLOR FILE II
SILPHEED
THEXDER
TypeMate
MATH TUTOR
GAMESTAR
FOOTBALL II
SUPER PITFALL
ACTIVISION
COLOR SCRIPSIT II
Soko-Ban
TANDY

Choose from a library of popular titles in entertainment, education and productivity

At Radio Shack, we're dedicated to making sure that you never run out of ways to use and enjoy your Color Computer. We've got a terrific line of software of all types.

Let your Color Computer open the door to a world of fun. Choose from a dazzling selection of popular and challenging games, including Nintendo™ classics.

One of the most valuable potentials of your Color Computer is in providing your children a head start in their education. We've got learning programs for children of all ages that will provide hours of productive fun! With this selection, you'll find programs that help develop hundreds of useful skills.

No matter what your personal needs, we've got programs that'll put your Color Computer to work where you need it most—like personal filing, word processing, spreadsheets and communications.

Send in the coupon for a free copy of our 1989 Software Buyer's Guide. Or pick one up at Radio Shack—your one-stop neighborhood software center.

Send me a new 1989 Software Guide.

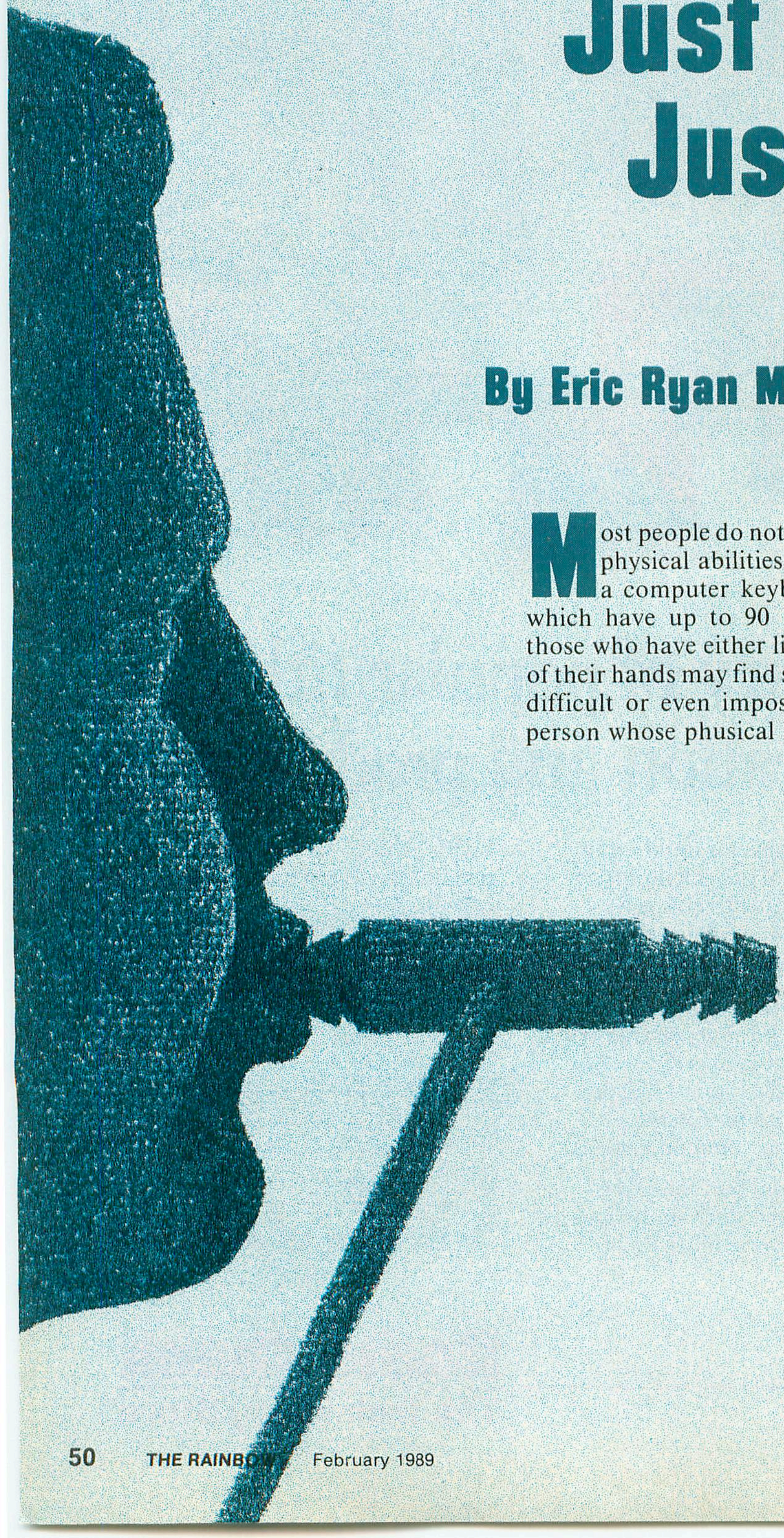
Mail to: Radio Shack, Dept. 89-A-710
300 One Tandy Center, Fort Worth, TX 76102

Name ________________
Address ________________
City ________________
State ________________
ZIP ________________
Phone ________________

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

Nintendo/TM Nintendo of America, Inc.

CoCo makes calculations easier for the disabled



Just One Touch — Just One Breath

By Eric Ryan Mims

Most people do not think about the physical abilities required to use a computer keyboard, many of which have up to 90 keys. However, those who have either limited or no use of their hands may find such a keyboard difficult or even impossible to use. A person whose phusical handicap inhibits all the fingers may not be able to operate even a calculator.

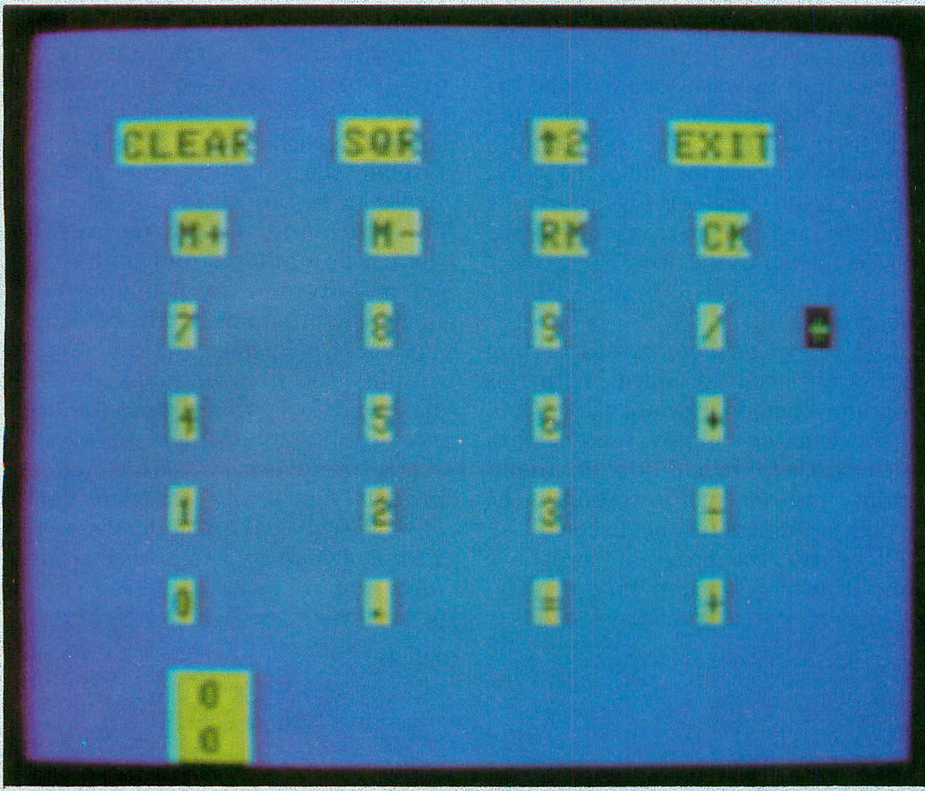
Single Key Calculator has six functions with memory and can be operated by a person who has lost the use of hands or fingers. In addition to the four basic vunctions of a calculator — addition, subtraction, multiplication and division — it can handle both square and square root functions. The use can also clear the screen or exit the program at any time.

The program was written on a 64K Extended Color BASIC CoCo 2 with one disk drive; however, the program would work with a 16K CoCo using a cassette player. The primary functions of this program could be adapted to be used with any computer using BASIC, but major changes may be needed to modify the graphics.

The right joystick's fire button is the only input device used for this calculator. Because the joystick is used, other types of buttons or switches can be connected to the computer through the

---

Eric Mims is a sophomore at BEE County College in Beeville, Texas. His Single Key Calculator project won several awards in the Alamo Regional Science Fair in San Antonio, Texas.



Calculator simulator during operation.

joystick port. This way, each user can choose the appropriate input device.

Program Operation

During operation, the program displays a facsimile of a calculator keyboard. A small arrow points to the first row of keys for a few seconds and then moves to the next row. After pointing to each row, the arrow moves back to the top row and the process is repeated.

As the arrow pauses at each row, the computer checks one of its joystick ports to see if the user has closed an on/off switch (connected in place of the fire button) to select the row containing a desired function. If so, the computer's arrow will point to each key in a column, beginning with the left-most key and moving to the right. At each key, the computer will pause for a few seconds to give the user time to choose that key.

The first 14 lines of *Single Key Calculator* contain the program instructions. Line 160 begins the actual program by clearing the screen and changing the background color to blue. Lines 170, 180, 220 and 230 set all the variables for the program. Lines 210 through 270 display the keyboard, while lines 280 and 290 display the memory sign and the selected numbers.

After the program has been started and the display cleared, two zeroes will appear at the bottom of the screen. If memory is being used, an 'M' will appear in inverse video at the upper-right corner. Lines 1210, 140, 1650 and 1900 display the function being used. In this manner, the user is always reminded of the calculation being performed.

Lines 320 through 430 form a routine that scans each row of the simulator's keyboard while waiting for the user to respond by pressing either the joystick's fire button or another switch connected to that port. Line 60 assigns the up-arrow cursor (displayed on the screen in inverse video) to `P$` and a blue square (to cover the cursor) to `Q$`. Finally, the `PRINT` location for the function being used is assigned to `E`.

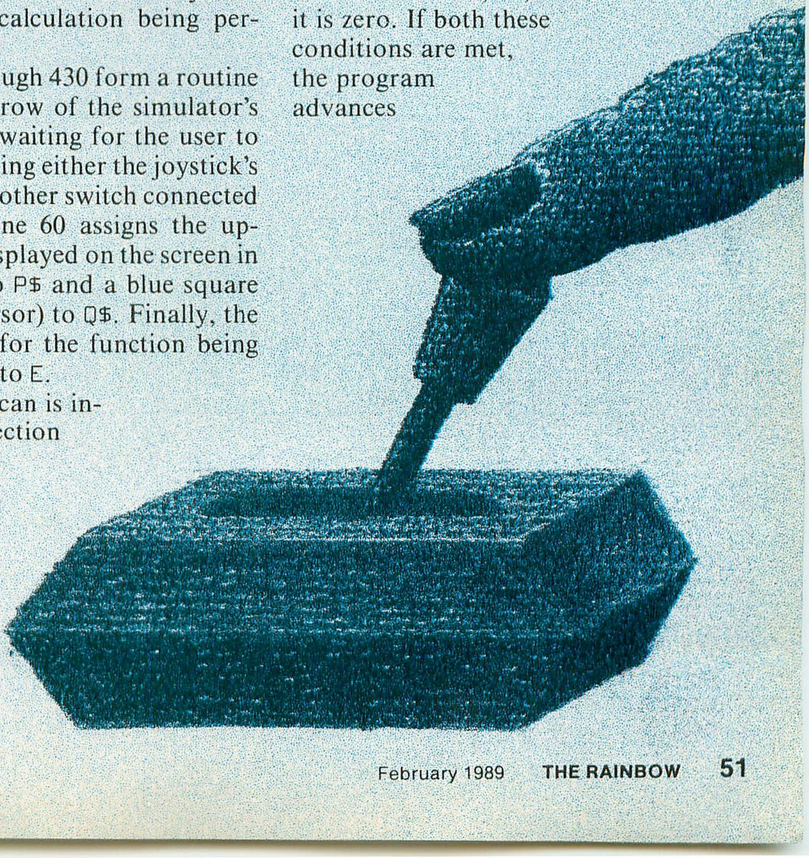
The joystick scan is included in each section of the program that scans either rows or keys. While this allows the program to run faster, the program would be shorter if all joystick scans were combined in one subroutine at the program's end.

The first row contains keys for the following functions: clear, square, square root and exit. The second row of the calculator contains these memory functions: memory +, memory -, memory recall and memory clear. Rows 3 through 5 include the numbers one to nine and the basic functions of division (/), multiplication (*) and subtraction (-). Finally, the sixth row contains 0, the decimal (.), the equal sign (=) and the addition function (+).

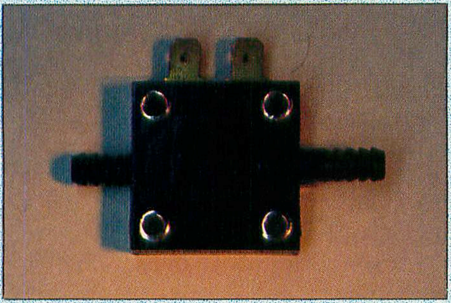
When one of the four basic functions is selected, the variable `S` is assigned the number corresponding to that sign. When the equal sign is selected, the program instructs the computer to check the value of `S` and, depending on the value, perform the selected operation. The functions and their corresponding values are as follows:

Value:	**Function:**
`S = 0`	no function assigned
`S = 1`	division
`S = 2`	multiplication
`S = 3`	subtraction
`S = 4`	addition

To prevent a Division by 0(/0) Error from stopping the operation of the computer, Line 1870 checks Variable `S` to see if division has been requested. If it has, the computer looks at the second number variable, `N2`, to see if it is zero. If both these conditions are met, the program advances



to Line 1930 and displays the message, "/0 Error." The program then assigns 0 to S, but does not erase the first number variable, N1. The user may continue by selecting another function.



Puff/sip switch.

User Response

As mentioned earlier, the joystick port is used as the only input device so that other switches, which might better serve the user, may be connected to the computer. The joystick button was used to develop and test this button. Later, a breath-activated *puff* switch was used. The puff switch allows the user to operate the keys of the simulator by lightly breathing into or sipping from a plastic tube connected to the device.

The puff switch used with this program is a Honeywell Model PSF 100A, purchased from Edmund Scientific. The switch, which has two ports, is closed when the difference in air pressure between the two ports is at least 0.02 pounds per square inch. The switch can be activated in two ways by using the two openings. The opening marked "High" is activated by high pressure (light breathing), while the opening marked "Low" detects low pressure (sipping).

To test the switch, I opened a Radio Shack joystick (Cat. No. 26-3008) and connected alligator clips to the fire button switch. The two wires from the clips were drawn out of the joystick case through the same hole used for the joystick cable. The puff switch was then connected to the clips and the program was run.

When a straw was used to extend the openings, the puff switch was triggered with little effort if the user's mouth completely covered the end of the straw. For best results, the port extension tube should be long enough to rest on a table, desk or the lap of the user.

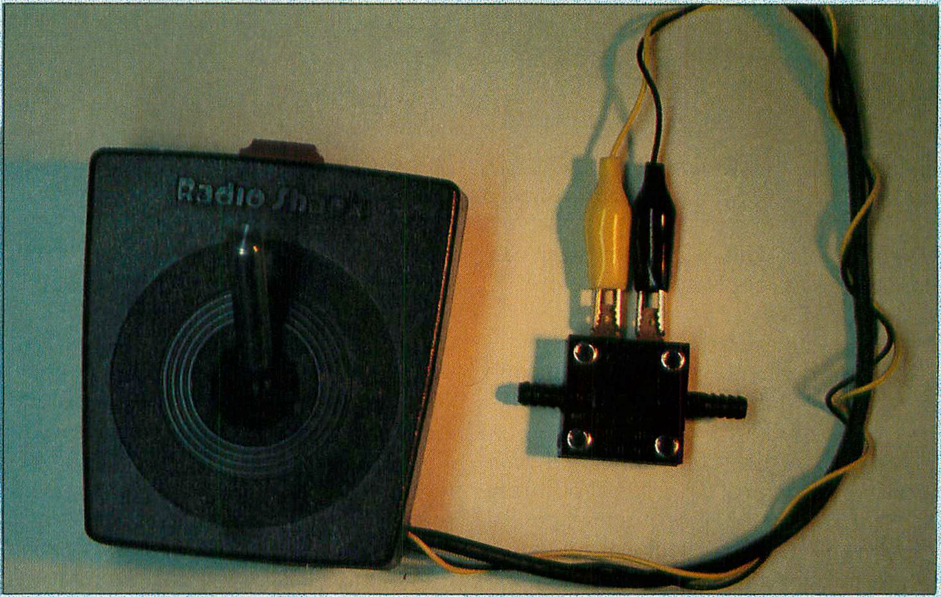
Conclusion

Single Key Calculator is a useful tool for the physically disabled. With this program, a person previously unable to use a calculator can now use one with little or no help. In addition, this application is just one demonstration of the CoCo's usefulness for the disabled.

Of course, the program does have some drawbacks. First, long calculations take a long time. Second, the computer must be set up, the program loaded and the appropriate switch connected to the computer before a disabled person can use the program.

Ideally, a computer designed for the quadriplegic user would not need another person to set up and turn on the computer each time it is to be used. Instead, the computer should be designed to be turned on and off with a puff switch. In addition to my program, such a computer could add to the person's freedom by including other single-key programs. Home computers like the CoCo have the potential to simplify the lives of many disabled persons. *Single Key Calculator* takes one step in that direction.

(Questions or comments about this program may be directed to the author at 433 Twin Oak, Seguin, TX 78155. Please include an SASE when requesting a reply.) □



Puff/sip switch connected to the Color Computer 2 through a joystick.

160	80	1280	8
350	151	1530	129
580	26	1750	29
810	71	END	244
1090	207		

The Listing: CALCLATR

```
10 CLS
20 PRINT "ONE KEY CALCULATOR"
30 PRINT "FOR SCIENCE FAIR 1985-
86"
40 PRINT "COPYRIGHT 1985 BY ERIC
 RYAN MIMS"
50 FOR X=0 TO 200:NEXT
60 CLS
70 PRINT@6, "ONE KEY CALCULATOR"
80 PRINT:PRINT"  THIS SINGLE-KEY
 CALCULATOR    SIMULATOR WAS CRE
ATED FOR USE BYDISABLED PERSONS
WHO DO NOT HAVETHE ABILITY TO OP
ERATE A        CONVENTIONAL CALC
ULATOR.";
90 PRINT"  THE    SIMULATOR IS A
SIX FUNCTION     CALCULATOR WITH
 MEMORY WHICH CANBE OPERATED WIT
H A SINGLE SWITCH.  THE SWITCH C
AN BE A STANDARD PUSH-BUTTON DEV
ICE OR A BREATH- OPERATED 'PUFF'
 SWITCH.press thefirebutton to
```

```
start";
100 IF PEEK(65280)=(127 OR 255)
THEN 100
110 ' ONE KEY CALCULATOR
120 ' FOR SCIENCE FAIR 1985-86
130 ' COPYRIGHT 1985 BY ERIC RYA
N MIMS
140 '
150 ' VERIABLE DEFINITION
160 CLS3
170 CLEAR
180 X=0:A=0:B=0:C=0:D=0:SOUND 1,
1
190 '
200 ' CREATE KEYBOARD
210 X=X+1
220 DATA CLEAR,67,SQR,75,^2,82,E
XIT,87,M+,133,M-,140,RM,146,CM,1
52,7,197,8,204,9,210,/,216,4,261
,5,268,6,274,*,280,1,325,2,332,3
,338,-,344,0,389,.,396,=,402,+,4
08
230 DATA 92,1,156,2,220,3,284,4,
348,5,412,6
240 IF X>24 THEN 280
250 READ A$,B
260 PRINT @B,A$;
270 GOTO 210
280 IF M<>0 THEN PRINT@62,"m";EL
SE PRINT @62,Q$;
290 PRINT@453,N1;:PRINT@485,N2;
300 '
310 ' ROW SCAN
320 A=A+1
330 IF A>6 THEN RESTORE:GOTO 180
340 READ B,C
350 PRINT@B,CHR$(127);
360 GOSUB 390
370 PRINT@B,CHR$(175);
380 GOTO 320
390 FOR W=0TO 25
400 P=PEEK(65280)
410 IF P<>(255 OR 127) THEN 460
420 NEXT W
430 RETURN
440 '
450 ' VARIABLE DEFINITION OF ARR
OW, BLUE SQUARE, AND LOCATION OF
 SIGNS
460 P$=CHR$(126):Q$=CHR$(175):E=
476
470 FOR X=0 TO 150:NEXT
480 RESTORE:ON C GOTO 520,770,10
40,1270,1480,1690
490 '
500 ' FIRST LINE
```

NO HYPE!
JUST QUALITY
OS9 SOFTWARE

StG Computers Inc.

SUPERCOMM 2.0 by Dave Philipsen $30

- Xmodem CHK,CRC & Ymodem batch transfer with buffering
- Autodial and redial with keyboard macros, auto log on
- ANSI and OS9 terminal emulation / Access to OS9 Shell
- ASCII file capture and send / Split screen conference
- Unattended remote file access with password protection
- Reliable with T2 or any other device even at 2400 baud
- will work with only 128K and a black and white monitor
- Pop-up windows w/Help and easy to use ALT-KEY commands
- done in 100% assembly language for effecient operation
- Not necessary to build new boot disk - just load and run!

OS9 Level 2 Login/BBS Package $50

- Auto-Baud Tsmon with command passing and optional hours
- Login with DES password encryption, logs access attempts
- Group and Net Accounts can be set-up, new users verified
- Configurable Menu w/User-select ANSI, OS9, or no graphics
- Mail, public News, and Net Mail (exchange w/other systems)
- BLAST included for ultra-fast bidirectional Net transfers
- Chat, Xmodem/Ymodem transfers, Help, multi-user conference
- Chown, FindFile, Pop/Label (for windows), other utilities
- Any OS9 command can be run from login, no doors required
- OS9 Level 2, 512k, Hard drive or NO-Halt controller req'd
- Limited free updates-modifications available upon request (call or write for details on OSK version of this package)

VEF Printer Dump for Star NX-1000 Rainbow $20

- has fast and slow dump modes, matches OS9 palettes

COMING ATTRACTIONS

- Hard disk backup-epic and incremental, partial restore option.

Indiana residents add 5% sales tax. COD Add $3. No credit cards.
Shipping & handling included. Send check or money order to:
StG Computers, Inc. - P.O. Box 24285 - Speedway IN 46224
(317) 241-6401 (voice) - (317) 244-3159 (modem, 3/12/2400)

Armchair Admiral

"Avast ye swabbies!" Roars Captain Blackbeard. "Hoist the Jolly Roger! When I gives the word, give 'em a broadside!" As Blackbeard's flotilla closes upon it's prey, a lookout suddenly cries, "Captain, a British Man-of-War!"

The time-honored parlor game of Battleship, enhanced by intelligent computer opponents, comes to your Coco3 complete with sloops and galleons. Up to eight opponents, any mix of human or computer. For the Coco3, please specify tape or disk when ordering. $14.95 + $2 S&H. WA residents please add 7.6% sales tax.

RAINBOW CERTIFICATION SEAL

Eversoft Games, Ltd.
P.O. Box 3354
Arlington, Wa 98223-3354
(206) 653-5263
10 am to 6 pm PST

RAINBOW CERTIFICATION SEAL

Personal check, money orders, and COD orders welcome.
GEnie mailbox: EVERSOFT

NOW FOR TV AND MONITOR
TAPE OR ONE DISK DRIVE

Frank Hogg Laboratory

12 Years of Service, Support, and Friendly Help!

After *Christmas* SALE

THE ELIMINATOR ™

NEW!!! MULTI I/O CARD FOR THE COCO

2 Serial Ports, 1 Parallel, Clock, Disk Interface!

This multi I/O card is called the *"Eliminator"* because it provides all the I/O capability under OS-9 that most people want without the need for a Multi-Pak Interface. If desired, it is possible to use one or more ***Eliminators*** in a MPI or other bus expander, with or without other hardware.

The Eliminator is completely address decoded, and does not depend on any of the slot select capabilities of the MPI for device selection.

The typical power consumption is well within the 300 mA at +5 VDC rating of all COCO models. Other voltages (+/- 12 VDC) are not required by the Eliminator.

2 Serial (RS-232C) Ports

- 15 software selectable baud rates from 50 to 38,400 baud - with alternate crystal can function as dual MIDI ports (31.25 KHz)

1 Parallel Printer Port

Real Time Clock

- built in battery backup (10 years)
- 100 year clock (automatically compensates for leap year)
- 50 bytes of battery backed scratchpad RAM

WD 1002-05 HD/FD Interface

- high speed (fastest COCO HD interface)
- WD 1002-05 supports up to 3 HDs and/or 4 FDs
- runs both HDs and FDs in **"no-halt"** mode (no lost keystrokes)
- new WDDisk OS-9 driver allows non OS-9 (MSDOS, RSDOS) disk access

EPROM - OS-9 auto-boot EPROM

Reg 199.95 **Special Offer 179.95**

Clock Chip add 30.00

Auto-boot EPROM with software for disk add 30.00

(HCA users contact FHL for special low upgrade price.)

FHL High Speed Hard Drive Kits Featuring *The Eliminator*™

Our top of the line system features Bruce Isted's new interface ***'The Eliminator'*** for the Western Digital WD 1002-05 high speed controller. **Features**; fastest system available, 1 megabyte transfer in only 37 seconds!! Twice as fast as other systems! Supports 4 floppy and 3 hard drives, type ahead for **both** floppy and hard disk, **autoboot** OS9 L1 or L2 from hard or floppy disk, **2 serial ports, 1 parallel port and Real Time Clock** socket. **Disadvantage**; does not support DECB. This is *the* system for the serious OS9 user.

KIT INCLUDES: ***'The Eliminator'***, Hard drive with WD 1002-05 controller, ST506 cable set, 3 foot 40 pin cable, Hard Drive Case with 60 watt power supply and fan, OS9 software for LI and LII with source, Complete instructions. Easy one evening assembly.

1 YEAR MANUFACTURES WARRANTY ON ALL SYSTEMS!

20 Meg **High Speed** Kit Complete	*799.00
40 Meg **High Speed** Kit Complete	*899.00
70 Meg **High Speed** Kit Complete	*1335.00
Assemble & Test any of the above add	60.00
OPTIONS:	
Real Time Clock chip	30.00
Serial cable set (2 DB25)	30.00
Parallel cable (Centronics)	30.00
Floppy Drive (Mounted in case)	128.00
Floppy Cable Int & Ext	25.00
FBU Fast Hard disk Back Up	75.00
R.S.B. RS Disk Basic Under OS9	39.95

START OS9

The EASY way to learn OS9 LII

ONLY 32.95

Book and Disk

Hard Drive Kits Featuring the Burke & Burke Interface

These systems features the Burke & Burke XT or XT RTC interface. **The hottest selling hard disk interface!** It uses popular and inexpensive IBM PC type drives and controllers. The drives and controller can be used in a PC at a later date if you want. For this reason it is the least expensive hard disk system available today. Not as fast as the *Eliminator* system but faster than any other system available. Note: Disk Extended Color Basic support and other software options are listed below. **Disadvantage**; requires a multi-pak.

KIT INCLUDES: Burke & Burke (B&B) XT PC interface. Hard drive with controller, 3 foot ST506 cable set. Hard Drive Case with 60 watt power supply and fan. Includes OS9 LI and LII software. 1 megabyte transfer in 45 seconds! Type ahead under OS9.

Complete instructions. Easy one evening assembly.

1 YEAR MANUFACTURES WARRANTY ON ALL SYSTEMS!

20 Meg Kit Complete 60MS	*498.00
30 Meg Kit Complete 60MS RLL	*548.00
40 Meg Kit Complete 60MS	*618.00
Assemble and test any of the above add	50.00
OPTIONS:	
B&B Real Time Clock (add to above)	30.00
B&B XT ROM Auto Boot from hard disk	19.95
B&B Hyper I/O run DECB on hard drive	29.95
B&B Hyper III Ramdisk/spooler for above	19.95
FBU Fast Hard disk Back Up	75.00
R.S.B. RS Disk Basic under OS9	39.95

Hard Drive Bits and Pieces

B&B XT PC style interface	69.95
B&B XT RTC interface w/clock/calendar	99.95
WD 1002-05 High Speed ctrler for the Eliminator (Supports both Hard and Floppy drives)	*199.95
Hard Drive case with 60W P/S and Fan	*99.95

SPECIFICATIONS: size 16" deep, 5.5" high, 7" wide. 60 Watt power supply with 3 drive type power connectors, quiet 12 volt DC fan, LED power indicator, color matches CoCo. Holds 2 1/2 height hard or floppy drives and has card guided space for a PCB the size of a drive (like the WD1002-05 controller)

Floppy Drives (5.25" and 3.5" FLOPPY DISKS)

TEAC High Quality Drives - 1 Year Warr.

FD55B 360K 40 Track DS 5.25"	118.00
FD55F 720K 80 Track DS 5.25:	151.00
FD35F 720K 80 Track DS 3.5"	147.00

(Bare drives, requires case and power supply)

ORDERING INFORMATION VISA and M/C. NY residents add 7% sales tax. US shipping add $3.50 for software. Hardware is more. Please call for Air Express shipping.

Call or send for FREE FHL NewsLetter and catalog.
****Most of our software requires OS9 LII and 512K.**
*** New LOWER PRICES!!!**

Frank Hogg Laboratory, Inc.
Since 1976
770 James Street - Syracuse, NY 13203
Fax 315/474-8225
Call 315/474-7856

Frank Hogg Laboratory

12 Years of Service, Support, and Friendly Help!

After *Christmas* SALE

Inside OS9 Level II

The Book by Kevin Darling ~~$39.95~~

SPECIAL ONLY 19.95

Are your tired of playing games with Level II? Do you want to find out what's going on inside OS9? This is the book for you! Over 200 pages of hints, kinks, bugs, source listings and much more. Written by the well known Compuserve SysOp, Kevin Darling. 'Must reading' says Dale Puckett in Rainbow!

DynaStar

Used by more OS9 users than any other!

FEATURES: Best OS9 **editor/word processor/text formatter**, has everything you would expect and more, supports terminals and windows simultaneously, auto-configurable, auto-indent for C and Pascal programming, mail merge for form letters, bug free, solid. New manual makes it easier to use than ever. Most popular word processor since 1982! Uses CoCo 3's windows for pop-up help menus, can be disabled. Two key sequence to move from anywhere to anywhere in your text. WordStar command style. Will work with files larger than memory. Merge function allows stringing many files together at print time. Full block manipulation, mark, move, copy, delete, read from disk, write to disk. Keyboard Macros: Define or redefine any control key (up to 29) to reproduce any key sequences, including commands! Macros can be read in at startup automatically or created on the fly as needed. Printer Control: Supports multiple printers via a print control file that transforms imbedded control characters to printer control characters. Changing printers is easy. Formatting Commands: Justification, word wrap, centering, headers, footers, macros, odd and even support, multiple index generation, multiple table of contents generation and more! DynaStar is the last word processor you will ever have to buy! Level I version also included on disk.

DynaStar word processor/formatter	~~150.00~~

SPECIAL ONLY 99.95

DynaSpell

by Dale Puckett

102,000 and 20,000 word dictionaries included. Supports both Level I and II. Fast, slick, the best spelling checker available for OS9. Written by RainbowTech columnist Dale Puckett.

DynaSpell spelling checker	75.00
SPECIAL WHEN PURCHASED WITH DYNASTAR	25.00

The WIZ

Did you ever wonder why there is only one really good communications package for OS9? The WIZ is so good that no one has been able to better it in over a year on the market! Simply the best package there is for OS9 and the CoCo III.
FEATURES: Mac-Like interface with windows, text and binary upload/download with xmodem, kermit, on line HELP,
AUTOLOGGING lets you dial up and log on to your favorite service, Macros, VT52 emulation, Usage log and much more.
The Wiz requires a RS232 Pak or similar device, LII and 512K.
Supports the Owl-Ware Super I/O board.

The WIZ	~~79.95~~

***Super* SPECIAL ONLY 49.95**

Disto RS-232 Pak (Compatible with Tandy RS-232 Pak)	49.95

NEW VERSION!

Sculptor

Is it a Database?
Is it a Programming Language?
Is it easy to use?
Will it run on other computers?
Is it the best program available?
YES! The New Version 1.16 is it!
100% Object Code Compatible
100% Data File Compatible
for over 100 Computer/OS combinations

Sculptor, a 4th Generation Language, is an applications generator, a database, and a programming language. Basic, C, Pascal, etc. are 3rd generation languages and assembly language is 2nd generation. In *Sculptor* you can develop an application in one tenth the time over Basic or one of the other 3rd generation languages. *Sculptor* brings the power of high level programming to the less experienced individual. If you cannot do what you want to do in a 3rd generation language, then *Sculptor* will open doors for you. In conventional programming 1/2 of your time is spent deciding what you want to do and 1/2 writing the code. With *Sculptor* most of your time is spent deciding what to do because it takes so little time to turn your dream into reality

In 1988 we sold an incredible number of *Sculptors* at the special price of $149. We proved that the market was there if the price was right. Version 1.16 lists for $695 on the IBM PC and goes up to $17,000 on a DEC VAX. Because of our success last year, thru a special arrangement we are now able to offer *Sculptor* version 1.16 to you for only $249.95. Now you can take applications created on your CoCo and run them on PC's, Unix machines etc. (with the proper runtime) *Sculptor* is the most powerful program available for the CoCo.

But wait... During this special introduction of version 1.16 we have reduced the price to ONLY $199.95!

Requires OS9 Level II and 512K. Works on floppies or hard disks.

***Sculptor* v1.16 $249.95 SPECIAL 199.95**

Existing *Sculptor* users can update to v1.16 for 60.00

ORDERING INFORMATION VISA and M/C. NY residents add 7% sales tax. US software shipping add $3.50. Please call for Air Express shipping.

Send for FREE FHL NewsLetter and catalog.
****Most of our software requires OS9 LII and 512K.**

Frank Hogg Laboratory, Inc.
Since 1976
770 James Street - Syracuse, NY 13203
Fax 315/474-8225
Call 315/474-7856

```
510 ' SCAN OF CLEAR, SQR, ^2, EX
IT
520 A=101:B=108:C=114:D=120
530 PRINT@92,CHR$(175);
540 PRINT@A,P$;:X=1:GOSUB 610:PR
INT@A,Q$;
550 PRINT@B,P$;:X=2:GOSUB 610:PR
INT@B,Q$;
560 PRINT@C,P$;:X=3:GOSUB 610:PR
INT@C,Q$;
570 PRINT@D,P$;:X=4:GOSUB 610:PR
INT@D,Q$;
580 GOTO 180
590 '
600 ' SCAN OF JOYSTICK BUTTON
610 FOR W=0 TO 25
620 P=PEEK(65280)
630 IF P<>(255 OR 127) THEN 670
640 NEXT W
650 FOR Y=0 TO 80:NEXT
660 RETURN
670 ON X GOTO 680,690,710,730
680 N1=0:N2=0:N$="":S=0:CLS3:SOU
ND 200,5:GOTO 180
690 IF S=0 THEN N1=SQR(N1)ELSE N
2=SQR(N2)
700 PRINT @B,Q$;:GOTO 180
710 IF S=0 THEN N1=N1^2ELSE N2=N
2^2
720 PRINT@C,Q$;:GOTO 180
730 END
740 '
750 ' SECOND LINE
760 ' SCAN OF M+, M-, RM, CM
770 A=165:B=172:C=178:D=184
780 PRINT@156,CHR$(175);
790 PRINT@A,P$;:X=1:GOSUB 840:PR
INT@A,Q$;
800 PRINT@B,P$;:X=2:GOSUB 840:PR
INT@B,Q$;
810 PRINT@C,P$;:X=3:GOSUB 840:PR
INT@C,Q$;
820 PRINT@D,P$;:X=4:GOSUB 840:PR
INT@D,Q$;
830 GOTO 180
840 FOR W=0 TO 25
850 P=PEEK(65280)
860 IF P<>(255 OR 127) THEN 900
870 NEXT W
880 FOR Y=0 TO 80:NEXT
890 RETURN
900 IF S=0 THEN 960
910 ON X GOTO 920,930,940,950
920 M=M+N2:PRINT@A,Q$;:GOTO 180
930 M=M-N2:PRINT@B,Q$;:GOTO 180
940 N2=M:PRINT@C,Q$;:GOTO 180
950 GOTO 1000
960 ON X GOTO 970,980,990,1000
970 M=M+N1:PRINT@A,Q$;:GOTO 180
```

```
980 M=M-N1:PRINT@B,Q$;:GOTO 180
990 N1=M:PRINT@C,Q$;:GOTO 180
1000 M=0:PRINT@D,Q$;:GOTO 180
1010 '
1020 ' THIRD LINE
1030 SCAN OF 7,8,9,/
1040 A=229:B=236:C=242:D=248
1050 PRINT@220,CHR$(175);
1060 PRINT@A,P$;:X=1:GOSUB 1110:
PRINT@A,Q$;
1070 PRINT@B,P$;:X=2:GOSUB 1110:
PRINT@B,Q$;
1080 PRINT@C,P$;:X=3:GOSUB 1110:
PRINT@C,Q$;
1090 PRINT@D,P$;:X=4:GOSUB 1110:
PRINT@D,Q$;
1100 GOTO 180
1110 FOR W=0 TO 25
1120 P=PEEK(65280)
1130 IF P<>(255 OR 127) THEN 117
0
1140 NEXT W
1150 FOR Y=0TO80:NEXT
1160 RETURN
1170 ON X GOTO 1180,1190,1200,12
10
1180 N$=N$+"7":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1190 N$=N$+"8":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1200 N$=N$+"9":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1210 S=1:SOUND 100,1:PRINT@E,"/"
;:N$="":PRINT@D,Q$;:GOTO 180
1220 IF S=0 THEN N1=VAL(N$) ELSE
 N2=VAL(N$):RETURN
1230 RETURN
1240 '
1250 ' FOURTH LINE
1260 ' 4,5,6,*
1270 A=293:B=300:C=306:D=312
1280 PRINT@284,Q$;
1290 PRINT@A,P$;:X=1:GOSUB 1340:
PRINT@A,Q$;
1300 PRINT@B,P$;:X=2:GOSUB 1340:
PRINT@B,Q$;
1310 PRINT@C,P$;:X=3:GOSUB 1340:
PRINT@C,Q$;
1320 PRINT@D,P$;:X=4:GOSUB 1340:
PRINT@D,Q$;
1330 GOTO 180
1340 FOR W=0 TO 25
1350 P=PEEK(65280)
1360 IF P<>(255 OR 127) THEN 140
0
1370 NEXT W
1380 FOR Y=0 TO 80:NEXT
1390 RETURN
1400 ON X GOTO 1410,1420,1430,14
```

```
40
1410 N$=N$+"4":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1420 N$=N$+"5":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1430 N$=N$+"6":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1440 S=2:SOUND 100,1:PRINT@E,"*"
;:N$="":PRINT@D,Q$;:GOTO 180
1450 '
1460 ' FITH LINE
1470 ' 1,2,3,-
1480 A=357:B=364:C=370:D=376
1490 PRINT@348,Q$;
1500 PRINT@A,P$;:X=1:GOSUB 1550:
PRINT@A,Q$;
1510 PRINT@B,P$;:X=2:GOSUB 1550:
PRINT@B,Q$;
1520 PRINT@C,P$;:X=3:GOSUB 1550:
PRINT@C,Q$;
1530 PRINT@D,P$;:X=4:GOSUB 1550:
PRINT@D,Q$;
1540 GOTO 180
1550 FOR W=0 TO 25
1560 P=PEEK(65280)
1570 IF P<>(255 OR 127) THEN 161
0
1580 NEXT W
1590 FOR Y=0 TO 80
1600 RETURN
1610 ON X GOTO 1620,1630,1640,16
50
1620 N$=N$+"1":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1630 N$=N$+"2":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1640 N$=N$+"3":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1650 S=3:SOUND 100,1:PRINT@E,"-"
;:N$="":PRINT@D,Q$;:GOTO 180
1660 '
1670 ' SIXTH LINE
1680 ' 0,.,=,+
1690 A=421:B=428:C=434:D=440
1700 PRINT@412,Q$;
1710 PRINT@A,P$;:X=1:GOSUB 1760:
PRINT@A,Q$;
1720 PRINT@B,P$;:X=2:GOSUB 1760:
PRINT@B,Q$;
1730 PRINT@C,P$;:X=3:GOSUB 1760:
PRINT@C,Q$;
1740 PRINT@D,P$;:X=4:GOSUB 1760:
PRINT@D,Q$;
1750 GOTO 180
1760 FOR W=0 TO 25
1770 P=PEEK(65280)
1780 IF P<>(255 OR 127) THEN 182
0
1790 NEXT W
1800 FOR Y=0 TO 80
1810 RETURN
1820 ON X GOTO 1830,1840,1870,19
00
1830 N$=N$+"0":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1840 N$=N$+".":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1850 '
1860 ' /0 ERROR TRAPPING
1870 IF (S=1 AND N2=0) THEN GOSU
B 1930:GOTO 1890
1880 IF S=0 THEN 1810 ELSE IF S=
1 THEN N1=N1/N2 ELSE IF S=2 THEN
 N1=N1*N2 ELSE IF S=3 THEN N1=N1
-N2 ELSE IF S=4 THEN N1=N1+N2
1890 S=0:SOUND 100,1:PRINT@E,Q$;
:N$="":N2=0:PRINT@C,Q$;:GOTO 180
1900 S=4:SOUND 100,1:PRINT@E,"+"
;:N$="":PRINT@D,Q$;:GOTO 180
1910 '
1920 ' ERROR SUBROUTINE
1930 PRINT@503,"/0 ERROR";:PLAY"
V2001T7DDDD":FOR F=0TO 250:NEXT:
PRINT @503,"";:FOR F=0TO 7:PRINT
Q$;:NEXT:RETURN
```

Orion TECHNOLOGIES

Your One-Stop Tele-Shop

P.O. Box 63196
Wichita, KS 67203
316-946-0440

TELEPAK & TELEPAK PLUS

For CoCo 1 or Multi-pak $44.95

The Truly Compatible RS232 Pack

$49.95 For ANY Coco Configuration

Uses the industry standard DB25 connector. Baud rates of 50 - 19,200 baud!
Compatible with ANY RSDOS or OS9 software that uses the Deluxe RS232 Pak.

High Speed Price Breakthrough!

2400 Baud Modem w/cable (State DB25 or 4 Pin)...$149.95
** Hayes "AT" command set ** Full 1 year warranty **
** Bell 103J, 212A, and CCITT V.22 BIS/V.23 **

Software:
Autoterm.....$39.95
Level II BBS.$29.95
Warp One.....$29.95
XTERM........$49.95
The Wiz......$59.95
The TELEPAK & PLUS have proven their compatibility with all the above AND:
* V-TERM emulator *
* MIKEYTERM *
* Greg-E-Term *
* Rickeyterm *
* Ultimaterm *

V.I.P. Series:
Writer III...$79.95
Database III.$69.95
Calc III.....$69.95

Cables:
DB25 M-M......$9.95
4 Pin - DB25..$9.95
(State whether for Modem or Printer)
For Magnavox 8CM515 Monitor......$14.95
Call or Write for your CUSTOM cable needs!

New! UP DOS From ESP $24.95
User/Programmer Friendly DOS
ESP-Key...Command repeat and edit function!
Power up your CoCo in any screen width or color combination!
Printer and Disk reliability at high speed - 35/40 track and double sided!
Multiple column PAGED DIRECTORIES - Edit even BASIC line numbers
Automatic boot of any program or OS-9 - Fits in a standard 8K EPROM
New Graphics Commands - HVIEW HLOAD HSAVE - Choose CM3 or MGE Loads/Saves
Configure to your tastes with a menu driven, easy to use M/L program!
Requires 128K CoCo 3 and disk.

10% discount on TELEPAK or TELEPAK+ and terminal package order!
Call or Write for more Package Discounts
Add $3.00 shpg./hndl. per order - C.O.D. an additional $3.00
No delay for personal checks

A system to aid physically handicapped people in controlling automated functions

Hands-Free Computing

By Dennis H. Weide

COEPP is an acronym for Computer Operated Equipment for Paralyzed Persons. In short, it provides a means for quadriplegics and other people who have limited physical movement to control automated functions around their homes or offices. Simple things, like turning lights and appliances on and off, are often impossible for disabled persons. Computerized systems cost more than those requiring them can afford to spend. So, I developed COEPP. It's nothing spectacular — it performs only simple tasks and functions — but it can give a new outlook on life for those who use it.

One COEPP system is now in use, and I'm currently working on two more. Each system is designed to meet the specific needs of the individual user. The system described here consists of a central processing unit, a

Dennis Weide is a communications technician for AT&T in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.

#	Function
1	Toggle Outlet #1
2	Toggle Outlet #2
3	Toggle Outlet #3
4	Toggle Outlet #4
5	Toggle Outlet #5
6	Toggle Outlet #6
7	Place a phone call
8	Answer/Disconnect call
9	Reset system

Figure 1: COEPP Functions

COEPP interface controller (CIC) and an outlet interface circuit (OIC) that provide the user with the ability to automatically dial one of ten preprogrammed telephone numbers and communicate via a speaker-phone. The system also lets the user answer an incoming call and hang up when the call is completed. Other functions include turning lights and appliances on and off and automatically restarting the system.

The user of the first system is a young girl with muscular dystrophy who is confined to a wheelchair. Access to the computer is provided via a radio transmitter, located on the wheelchair, and a receiver in the CIC. By operating a joystick connected to the transmitter, the user can select and execute any of the nine functions shown in Figure 1. For a quadriplegic, the joystick can be replaced with "sip switches."

How the System Works

The COEPP system is easy to use once you understand how it works. Figure 2 is a simplified block diagram of the system. The CIC provides the means by which the CPU communicates with the OIC and LED display unit. Interconnecting cables are shown as lines in Figure 2 and are labeled according to their function. Addresses are shown in hexadecimal (i.e., FF40), and bit positions are shown in parentheses. Therefore, the line labeled FF40 (0-7) represents eight wires that connect address $FF40 bits 0 through 7 to the outlet interface. All signals between the OIC and the CPU must pass through the CIC.

The OIC contains the outlet relay drivers, the telephone relay driver, the radio receiver, the low voltage power supply and the AC outlets and bus.

The display unit provides a visual display for the CPU, while the speakerphone provides a hands-free audible link to the telephone.

Let's discuss the operation of the system. The radio transmitter (not shown in Figure 2), which is fastened to the wheelchair, is connected to an Atari-style joystick that has been modified to allow only forward and backward movement. The current function number is displayed on the LED display unit. Pushing the joystick forward advances the function number, while pulling it back executes the function. As an example, assume you have a desk lamp plugged into Outlet Number 5 and the lamp is currently off. Select Function 5 by pushing the joystick forward until the number 5 is displayed on the display unit. Execute the function by pulling the joystick back. The number 5 will flash on the display unit, indicating the function has been executed; the desk lamp will light. When the display

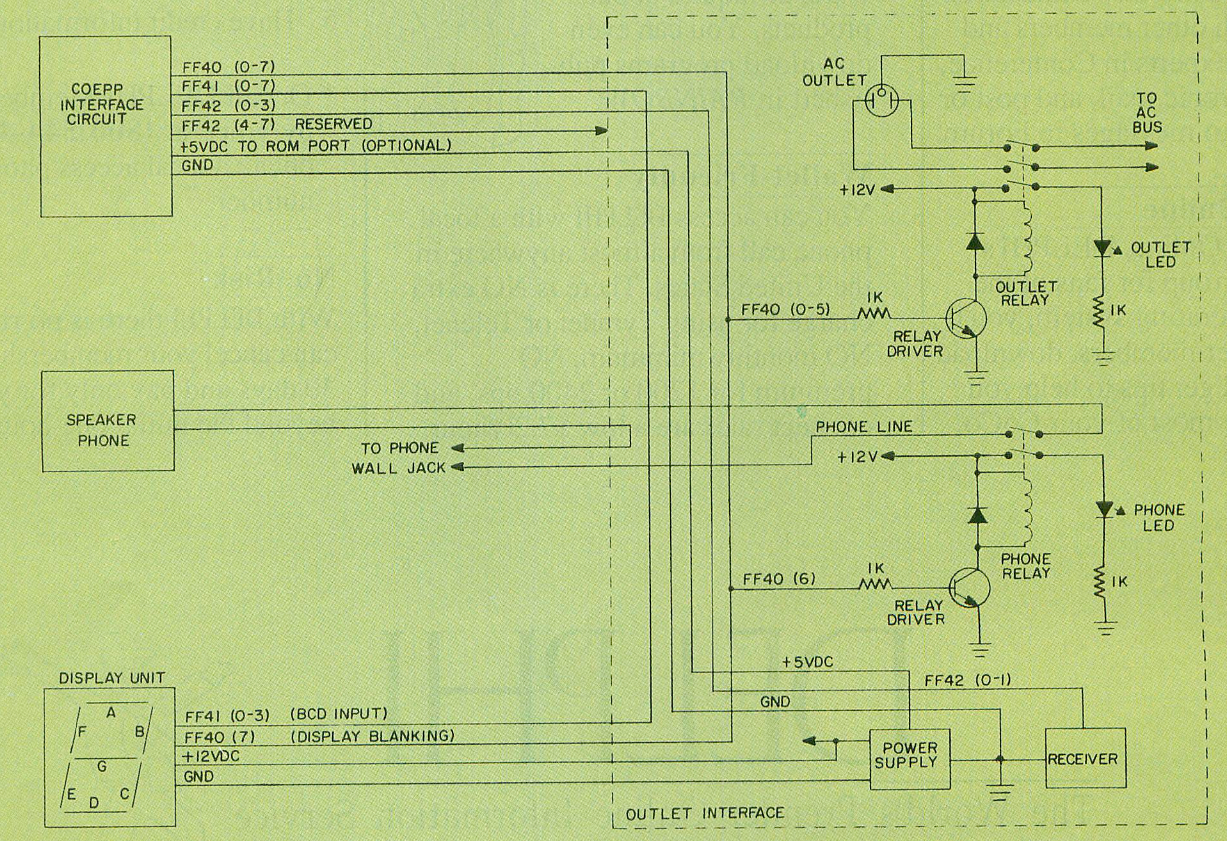

COEPP INTERFACE CIRCUIT
FF40 (0-7)
FF41 (0-7)
FF42 (0-3)
FF42 (4-7) RESERVED
+5VDC TO ROM PORT (OPTIONAL)
GND
AC OUTLET
TO AC BUS
+12V
OUTLET LED
OUTLET RELAY
FF40 (0-5)
1K
RELAY DRIVER
1K
SPEAKER PHONE
TO PHONE WALL JACK
PHONE LINE
+12V
PHONE LED
PHONE RELAY
FF40 (6)
1K
RELAY DRIVER
1K
+5VDC
FF42 (0-1)
GND
DISPLAY UNIT
A
F
B
G
E
D
C
FF41 (0-3) (BCD INPUT)
FF40 (7) (DISPLAY BLANKING)
+12VDC
GND
POWER SUPPLY
RECEIVER
OUTLET INTERFACE

Figure 2: COEPP System Simplified Block Diagram

What your CoCo was really meant for.

Expanding Horizons

Take your CoCo beyond the limits of floppy diskettes — connect to DELPHI, your **complete online business and personal resource**. With your modem and a local phone call, select from tens of thousands of downloadable programs, meet friends from across the globe, or tap into the world's most comprehensive databases to expand the horizons of your CoCo.

Your Resource for Color Computers

DELPHI's special group for owners of Tandy Color Computers is supported by the people who bring you *RAINBOW* Access extensive databases where you can upload your favorite files and download programs written by other personal computer enthusiasts. Chat with other members and resident experts in Conference, use electronic mail, and post or respond to messages in Forum.

OS–9 Online

In OS–9 Online, DELPHI's interest group for fans of the OS–9 operating system, you'll meet other members, download files, and get tips to help you make the most of your CoCo.

RAINBOW Online

DELPHI is your online connection to *RAINBOW*. You can renew your subscription, meet other Color Computer owners, order software or hardware, or inquire about products. You can even download programs published in *RAINBOW*.

Wallet-Friendly

You can access DELPHI with a local phone call from almost anywhere in the United States. There is NO extra charge for using Tymnet or Telenet, NO monthly minimum, NO premium for 1200 or 2400 bps, and connect rates are a low $7.20/hour.

FREE Lifetime Membership

As a *RAINBOW* subscriber, you get a **FREE** lifetime DELPHI membership ($29.95 value) which includes a credit worth one evening hour of usage ($7.20).
If you don't already subscribe to *RAINBOW*, just request a subscription when you sign-up to DELPHI, and, for the $31 subscription fee, you'll get the same great deal!

Sign up now - Online!

With your CoCo and modem:

1. Dial 1-617-576-2981.*
2. Once connected, press RETURN once or twice.
3. At Username:, type **JOINDELPHI**
4. At Password:, type **RAINBOW**, if you already subscribe to *RAINBOW*.
   Type **SENDRAINBOW**, if you do not yet subscribe and wish to do so.
5. Have credit information ready.

* Or call DELPHI Member Services by voice at **(800)544-4005** to obtain a local access phone number.

No Risk

With DELPHI there is no risk. You can cancel your membership within 30 days and pay only for your usage beyond the initial one-hour credit.

DELPHI

The World's Premier Online Information Service

General Videotex Corporation • Three Blackstone St • Cambridge MA 02139
800-544-4005 • 617-491-3393

unit stops flashing, you can select another function or execute Function 5 again. If the lamp is on, executing Function 5 again will turn it off.

Functions 1 through 6 and Function 8 all work the same way. Function 9 is a safety and convenience feature that turns everything off.

Placing a Phone Call

Function 7 is a special function for placing phone calls using a speakerphone. You can program up to 10 telephone numbers into the computer, which can then be dialed using Function 7. If a TV or monitor is connected to the computer, the telephone numbers assigned to memory slots 0 through 9 will be displayed, as shown in Figure 3.

```
Telephone Book

#0    5551212
#1    2431371
#2    18002223000
#3    2471611
#4    911
#5    13122556400
#6    12123389900
#7    8656210
#8    8429900
#9    0

Note: Your numbers will be differ-
ent from these.
```

Figure 3: Visual Phone Number Display

Here's how to place a call. First, select Function 7 by pushing the joystick forward until 7 is displayed, then execute it by pulling the joystick back. When the function has been executed, a zero will be displayed. This is the first of 10 preprogrammed telephone numbers (slots 0 through 9). Select the number you want to dial by pushing the joystick forward again until the slot number you want is displayed. For example, the telephone number for the local time and temperature in Albuquerque is 247-1611. In Figure 3, this phone number is assigned to Memory Slot 3. Push the joystick forward until 3 is displayed, then pull the joystick back. The computer will seize the phone line, and you'll hear a dial tone. The computer will then dial the number. As each number is dialed, it will be shown on the display unit. When dialing is completed, the display unit will flash Function 8. You are now ready to hang up the phone when the call is finished. Function 8 is also used to answer incoming calls. Functions can be selected and executed in any order. That is, you can place a phone call, then turn any outlet on or off while talking on the phone.

A CoCo

By now, you've probably guessed that the CPU used for the COEPP is actually a CoCo 1, 2 or 3. While the CoCo 3 has replaced the CoCo 1 and 2, the older versions are a long way from being extinct. In fact, for the first COEPP system, I purchased a 64K CoCo 2 from a pawn shop for $50. It was in fine working condition and is now being used to make someone's life a little easier.

Why use a CoCo? Because it's a powerful 8-bit microcomputer that's easy to program and interface to the outside world. All necessary signals are available on the ROM port, which can be addressed directly via machine language or BASIC routines.

The System

It's important to understand that the system described here should be used as an example. The schematics shown are the final drawings for the first system.

COCO Stuff

Hardware & Software

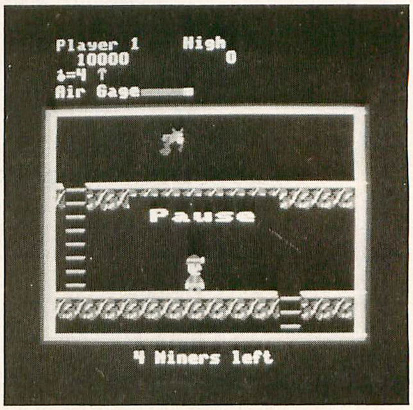
Special - Bare SSDD Half Height Drives - $69.95
Drive 1 Upgrades (26-3129 or 3131) - $99.95
2 Drive System* (2 DSDD, 6ms) - $299.95
COCO 1 & 2 64K Upgrade - $19.95
Serial to Parallel Interface - $54.95
COCO 3 512K Upgrade - $189.95
ADOS - $29.95 ADOS 3 - $39.95
In Quest of the Star Lord - $34.95
Gauntlet - $28.95 Pyramix - $24.95
Art Deli (440 Pix on 10 Disks) - $99.95
Art Deli II (220 Pix on 5 Disks) - $49.95
Coco Max III - $79.95 Max 10 - $79.95
Dragonblade - $19.95 Sixdrive - $19.95
Kung Fu Dude - $24.95 Telewriter 64 - $59.95

*Drive System furnished with Disto Controller and carries a 90 day warranty.

The Computer Center
5512 Poplar Ave. Memphis, TN 38119
901-761-4565

Add $4.90 for Shipping. Visa, Master Card, and Money Orders Accepted. Allow 3 Weeks for Personal Checks. Prices may change without notice. NO CODS. Orders outside 48 States please double Shipping Charge.

GAME POINT SOFTWARE



MINE RESCUE by Steve Bjork

A terrible mine disaster has just occurred and it will be up to you and your talents to enter the mine, jump the pits, avoid the spikes, fight off the bats and other creepy crawlers and get air to the needy victims. Mine Rescue features over 2 megabytes of arcade style graphics, real time music and multiple mine levels. Hours of fun! Requires a CoCo III and is available on Disk or Tape. ONLY $24.95.

Write the words "I am a terrific Home Manager!" with your order and pick this game up for only $19.95 now through the end of February 1989!!

"The graphics are very sharp and action is smooth ..."
1/89 Rainbow Magazine Review

ALSO AVAILABLE: BASH, RUPERT RYTHYM, WARP FIGHTER 3-D and SPACE INTRUDERS. FOR THE COLOR COMPUTER 3 DISK OR TAPE SYSTEM. JUST $24.95 EACH.

ATTENTION PROGRAMMERS: GAME POINT SOFTWARE IS LOOKING FOR TALENTED WRITERS. TOP ROYALTIES GUARANTEED.

ADD $3.00 S/H
C.O.D. $2.50 EXTRA
CALIFORNIA RESIDENTS PLEASE INCLUDE 6.5% SALES TAX

SEND CHECK OR MONEY ORDER TO:
GAME POINT SOFTWARE
P.O. BOX 6907
BURBANK, CA 91510-6907
(818) 566-3571

I haven't included a parts list, since each system is specially designed. This information is provided to show the different methods used so you can design your own peripheral equipment.

First, let's look at the power supply used to power the peripheral interface equipment. Figure 4 shows a simple, easy-to-construct power supply. The most important thing to remember is to use adequate supply and ground leads. Use a ground bus system and lots of filtering to ensure clean power for the project. Bypass each IC power lead with a 0.1MFD. capacitor to ground. The +5VDC output is not necessary if you power the CIC from the computer. But the cost of the additional regulator (7805) is low enough to justify powering the CIC from this supply.

Figure 5 is the schematic drawing for the light emitting diode (LED) display unit. It works the same as a standard seven-segment display and can be replaced with one if a smaller display is acceptable to you. I chose an LED display over a CRT (television or monitor) because of the lower cost and the fact that the LED display is small (the numbers are 4 inches high) and yet can still be seen from anywhere in the room. The LEDs are mounted in ¼-inch holes drilled in a piece of ⅛-inch clear plexiglass and covered with a piece of red plexiglass to provide a professional appearance.

The display segment layout is shown at the bottom of Figure 5. Each segment (A through G) has its own current-limiting resistor. Segments A, D and G each have five LEDs and use a 220-ohm resistor. The other four segments each have four LEDs and use a 330-ohm resistor. This arrangement produces a uniform brightness for all display segments.

The 7447 integrated circuit (IC) is a BCD-to-7 segment decoder IC. It takes a binary-coded-decimal (BCD) input (IN1-IN4) and lights the proper output segments (A through G) to display a single-digit number.

The 7805 voltage regulator chip uses the +12 VDC input from the power supply in the outlet interface to provide the +5 VDC output required by the 7447 IC. This arrangement eliminates the need to run two seperate voltages to the display unit and allows you to use a smaller diameter cable.

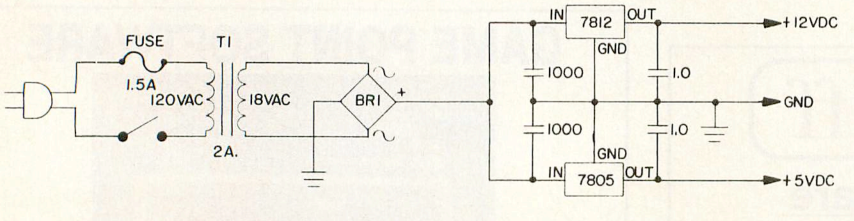


Figure 4: Dual Voltage Power Supply

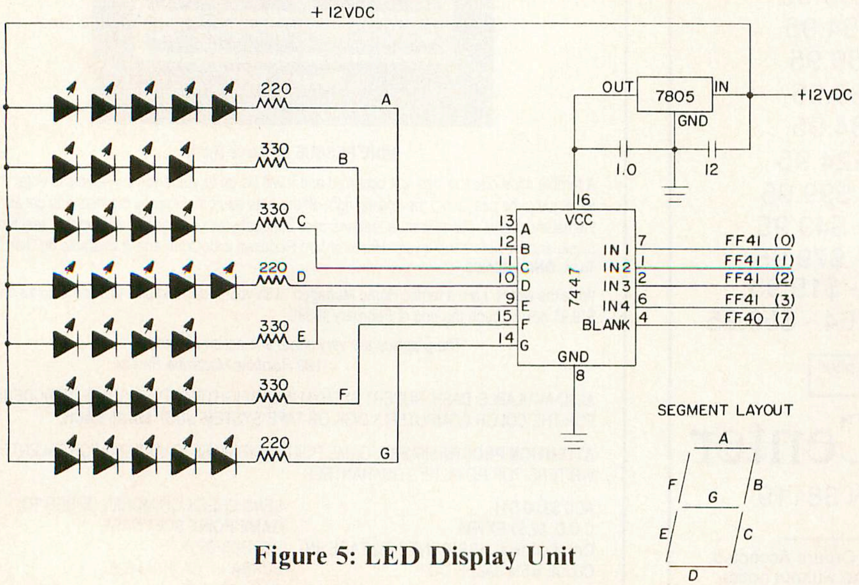


Figure 5: LED Display Unit

Pin 4 of the 7447 is the blanking lead and is used to flash the display. When this lead goes low, the display will be blanked out.

The Radio Link

The radio link uses a radio-controlled (R/C) car transmitter and receiver to link the user with the computer. I'll show you here a general idea of how you might use R/C equipment for a radio link. It is very unlikely that you'll be able to find the same model transmitter and receiver that I used. But using a little common sense and electrical knowledge, you should be able to modify your radio. The only modification to the transmitter is to replace the unit controls with a standard Atari-style joystick. This allows the user to send one of two signals (joystick forward and joystick backward) to the receiver located in the outlet interface.

The receiver is a little more difficult to modify (see Figure 6). The blue and grey wires connected to the drive motors are used to reverse the 5VDC polarity to the drive motors. This allows the motors to be operated in the forward and reverse direction. I used optocouplers to convert the voltage polarity reversal into two digital logic signals. Operating the transmitter joystick in the forward direction causes one optocoupler LED to conduct, while operating the joystick in the reverse direction reverses the voltage polarity and causes the other optocoupler LED to conduct. The output of the two logic signals are of the wrong state, so a 74LS04 IC (IC3B shown in Figure 7) is used on the CIC board to invert the signals.

The receiver requires +9 VDC to operate and 5 VDC to power the motors. The +9 VDC is supplied by dropping the +12 VDC across four diodes. Each diode drops about .7 volts, providing an output of approximately 9.2 VDC. A 7805 voltage regulator IC provides the +5 VDC from the +12 VDC input.

The Interface Circuit

Figure 7 shows the CIC used to interface the peripheral equipment to the computer. The heart of this circuit is IC2, the 8255 Programmable Peripheral Interface (PPI) chip. This chip provides three programmable 8-bit parallel ports. For this project, ports A and B are programmed as output ports and port C as an input port by loading the PPI internal register ($FF43) with decimal 129.

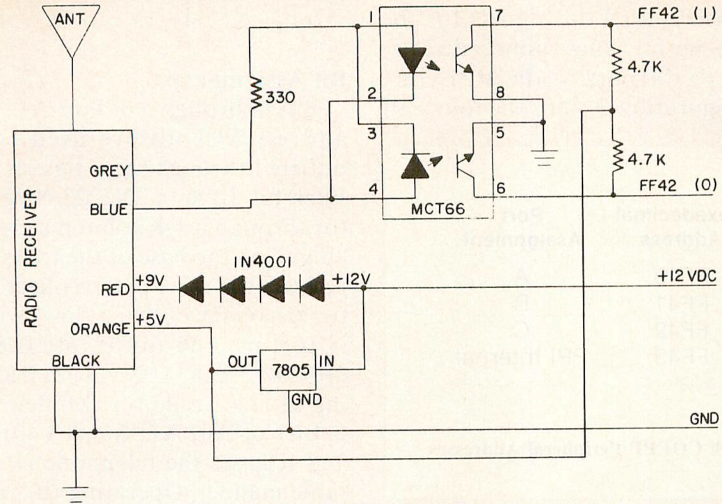

ANT
RADIO RECEIVER
GREY
BLUE
RED
ORANGE
BLACK
330
MCT66
1
2
3
4
5
6
7
8
4.7K
4.7K
FF42 (1)
FF42 (0)
1N4001
+9V
+12V
+12 VDC
+5V
OUT
7805
IN
GND
GND

Figure 6: Radio Control Receiver

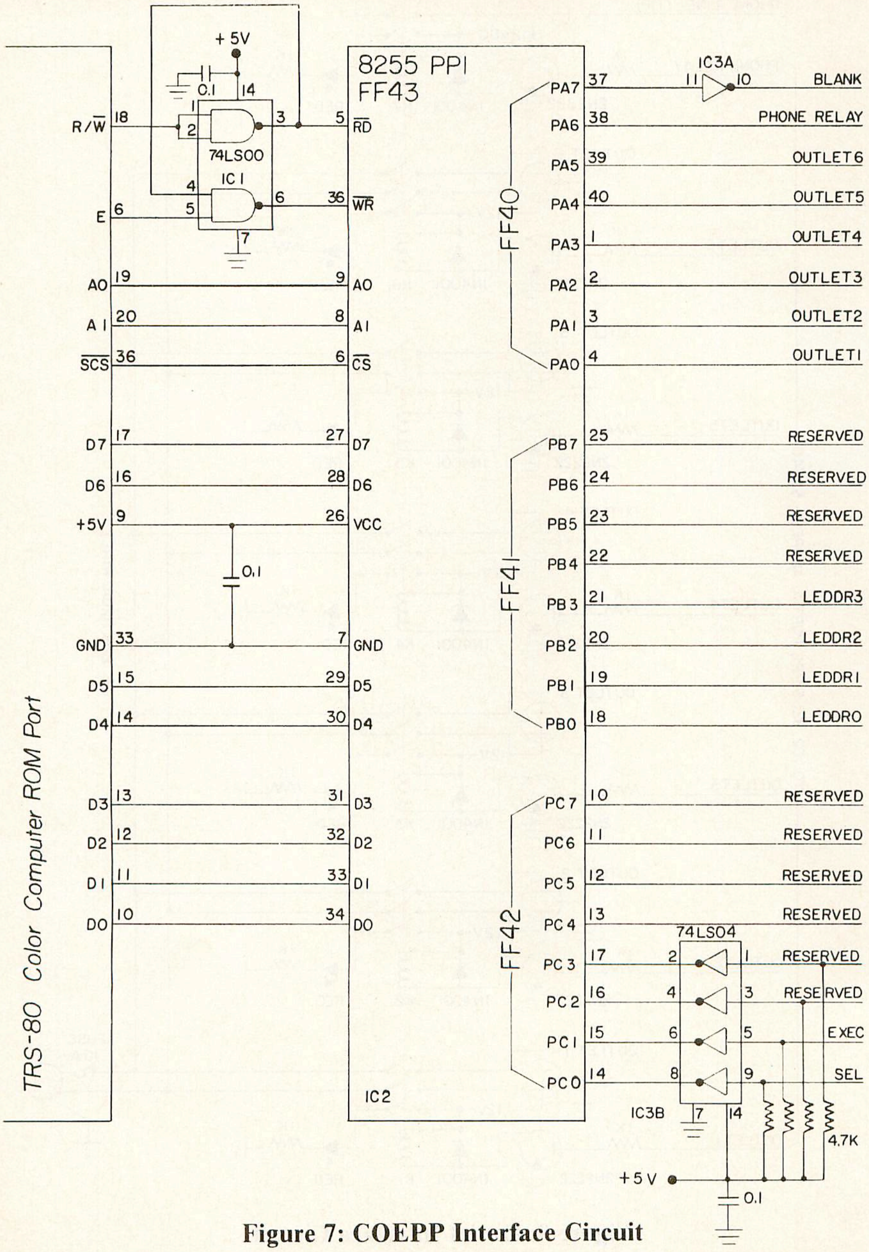

TRS-80 Color Computer ROM Port
R/W̄
E
A0
A1
S̄C̄S̄
D7
D6
+5V
GND
D5
D4
D3
D2
D1
D0
+5V
0.1
14
74LS00
IC1
7
8255 PPI
FF43
RD̄
WR̄
A0
A1
C̄S̄
D7
D6
VCC
GND
D5
D4
D3
D2
D1
D0
IC2
FF40
FF41
FF42
PA7
PA6
PA5
PA4
PA3
PA2
PA1
PA0
PB7
PB6
PB5
PB4
PB3
PB2
PB1
PB0
PC7
PC6
PC5
PC4
PC3
PC2
PC1
PC0
IC3A
BLANK
PHONE RELAY
OUTLET6
OUTLET5
OUTLET4
OUTLET3
OUTLET2
OUTLET1
RESERVED
RESERVED
RESERVED
RESERVED
LEDDR3
LEDDR2
LEDDR1
LEDDR0
RESERVED
RESERVED
RESERVED
RESERVED
74LS04
RESERVED
RESERVED
EXEC
SEL
IC3B
4.7K
+5V
0.1

Figure 7: COEPP Interface Circuit

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

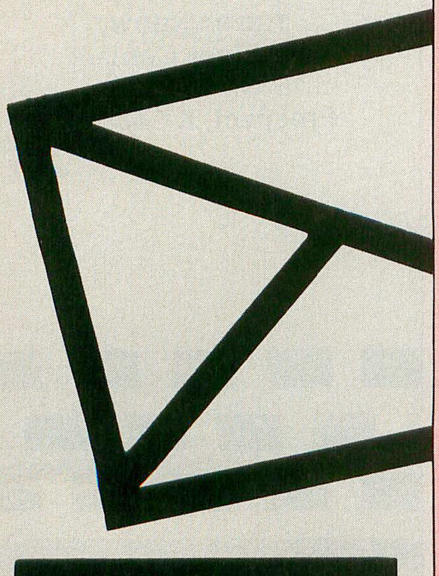
THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059. This applies to everyone *except* those whose subscriptions are through our distributor in Australia.



The 74LS00 (IC1) provides the proper Read and Write signals for the PPI. All other I/O lines connect directly from the ROM port to the PPI chip. This configuration assigns the four PPI addresses to CoCo addresses $FF40 through $FF43, as shown in Figure 8.

Hexadecimal Address	Port Assignment
FF40	A
FF41	B
FF42	C
FF43	PPI Internal

Figure 8: COEPP Peripheral Addresses

Bit Assignments

Bits 0 through 5 of Port A (PA0-PA5, address $FF40) are used to toggle outlets 1 through 6 (see figures 7 and 9). Each bit drives a 2N2222 NPN transistor through a 1-Kilohm bias resistor. A "high" on the base of the transistor will operate the relay in the collector circuit to turn on the outlet; a "low" will release it to turn the outlet off (i.e., `POKE &HFF40,PEEK(&HFF40) or 8` and pressing ENTER would turn Outlet 3 on.)

Bit 6 of Port A (PA6, $FF40) operates and releases the telephone relay in the same manner. Operating the relay con-

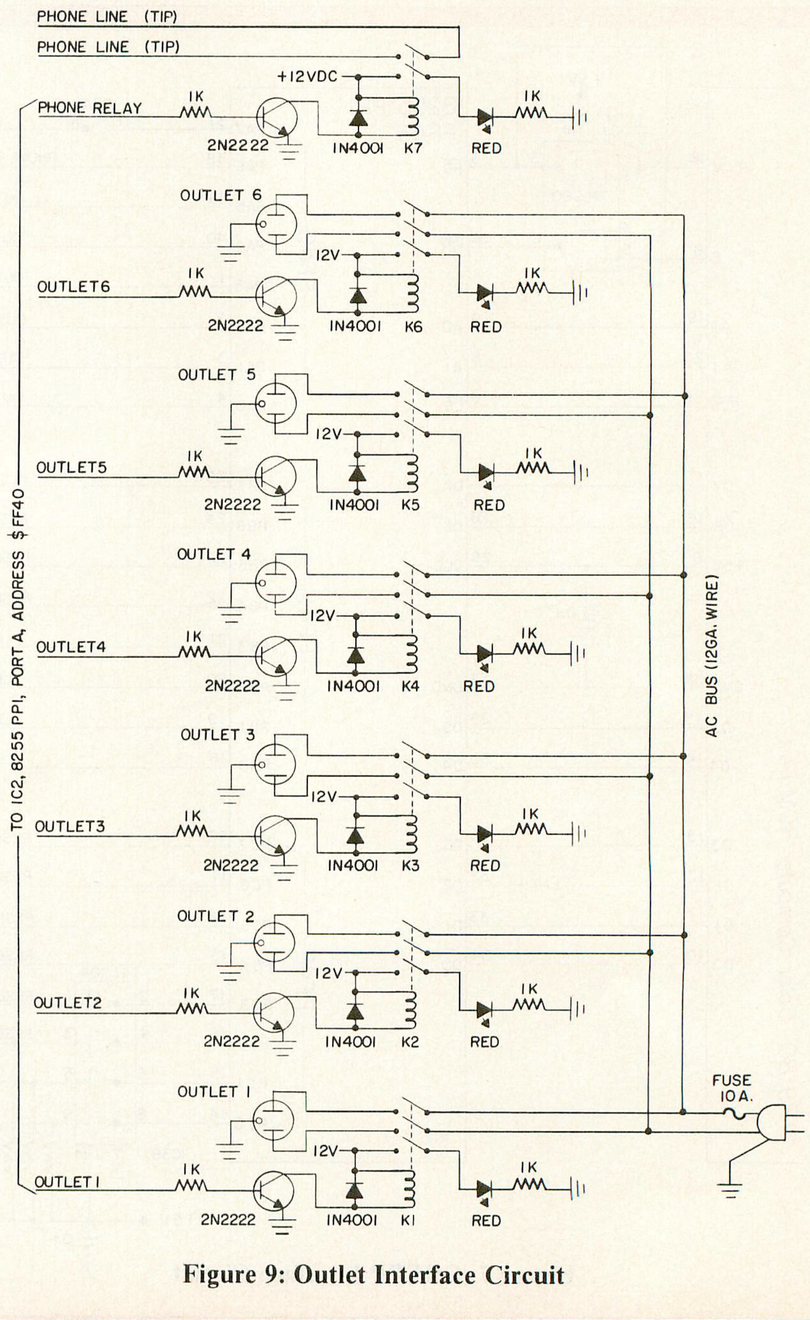

PHONE LINE (TIP)
PHONE LINE (TIP)
+12VDC
PHONE RELAY
IK
2N2222
IN4001
K7
RED
OUTLET 6
OUTLET6
12V
K6
OUTLET 5
OUTLET5
K5
OUTLET 4
OUTLET4
K4
OUTLET 3
OUTLET3
K3
OUTLET 2
OUTLET2
K2
OUTLET I
OUTLET I
KI
TO IC2, 8255 PPI, PORT A, ADDRESS $FF40
AC BUS (12GA. WIRE)
FUSE
IO A.

Figure 9: Outlet Interface Circuit

Making the COMPUTER CENTER **MicroWorld** *of Computers*

Affordable.....

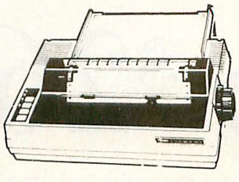
MicroWorld II
PO Box 5330
Clinton, NJ 08891

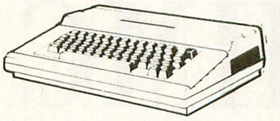
Since 1982

MicroWorld
PO Box 69
Wind Gap, Pa. 18091

Since 1982

CALL: In Pa: (215) 863-8911
In NJ: (201) 735-6138





Free Shipping* | 100% TANDY Products*

CoCo

26-3334 CoCo III, 128K	$119.00
26-3215 CM-8	$248.00
26-3133 FD-502 Dr 0, CoCo	**$179.00**
26-2802 DMP-106	$149.00
26-2814 DMP-132	$245.00
26-1208 CCr-81	$43.00
26-3008 Joysticks (Pair)	$10.00
26-3025 Color Mouse	$33.00
26-3125 Deluxe Color Mouse	$38.00
26-3012 **Joystix - DELUXE**	$24.00
26-3028 Hi-Res Joystick Intfce	$8.00

CoCo Upgrades

AXX-7117 CoCoIII, 512K Bd	**$199.00**
AXX-7123 Multi-pk Up-Old	$12.00
AXX-7124 Multi-pk Up-New	$12.00

CoCo Software

26-3031 OS-9 Level II	**$64.00**
26-3032 **OS-9 Devel Sys.**	**$82.00**
26-3035 Multivue	$40.00

COMPUTERS

25-1053 TANDY 1000HX	$445.00
25-1600 TANDY 1000TX	**$819.00**
25-1401 TANDY 1000SL	$699.00
25-1601 TANDY 1000TL	$969.00
25-3500 TANDY 1400LT	$1375.00
25-4071 TANDY 3000HL	$1135.00
25-4072 TANDY 3000NL	$1299.00
25-5000 TANDY 4000	$1979.00
25-5100 TANDY 4000 LX	**$2999.00**

MONITORS

25-1020 VM-4 Mono. Mon.	**$95.00**
25-1023 **CM-5 RGB** Mon.	**$220.00**
25-1024 **CM-11 RGB** Mon.	$310.00
25-4035 EGM-1 Monitor	$525.00
25-3011 VM-5 Mono. Mon.	$115.00
26-3215 CM-8	$248.00

HARD CARDS

20 Meg Hard Card	$439.00
30 Meg ZUCKER	$499.00

HARD DISKS

Seagate 20 Mg Kit	$299.00
Seagate 30 Mg Kit	$349.00
Seagate 40 Mg Kit(no ctrl)	$399.00

FLOPPY DRIVES

TEAC 5 1/4 Disk-360kb	$99.00
TEAC 3 1/2 Disk-720kb	$119.00

Radio Shack:

5 1/4 Ext. Drive-HX/EX	**$180.00**
3 1/2 Ext. Drive-HX/EX	$199.00
5 1/4 Disk-360kb	$125.00
3 1/2 Disk-720kb	**$125.00**
3 1/2 to 5 1/4 Adapter	$24.00
3 1/2 Disk-720kb *TL*	$125.00
3 1/2 - 5 1/4 Adapter *TL*	$24.00
5 1/4 1.2M FDD Kit	**$215.00**
5 1/4 360K FDD Kit	$140.00

PRINTERS

DMP-106	$149.00
DMP-132	$245.00
DWP-230	$345.00
DMP 440	$545.00
DMP 2120	**$1199.00**
LP1000 Laser	$1899.00

BOARDS

Smart Watch	$30.00
Plus Upgrade Adapter Board	$12.50
Memory Plus Expansion BD	$110.00
Plus RS-232	$45.00
256K RAM Kit	$110.00
2 Port Serial Baord	$79.00
EGA Adapter	**$185.00**

MODEMS

1200 Baud Pc Modem	$79.00
2400 Baud Half Cd Modem	$135.00
Plus 1200 Baud PC Modem	**$150.00**

MISC

Serial Mouse	**$36.00**
Joystick - DELUXE	**$24.00**
Monitor Platform	**$24.00**
Ribbons - DMP-130	$8.00
Ribbons - DMP-105/106	$5.50
Flips - R/S	**$11.00**
Disk Clean Kits	$5.00
Cover - DMP-105/6	$3.00
Cover - CoCo II/III	$3.00
Cover - DMP-130	**$3.00**
Bulk Erasers	$12.00
Flip n' Files w/lock 3-1/2 or 5-1/4	$11.00
Library Case-Black	$1.50
Library Case-Tan	$2.00
Paper- Mini 20#	$4.00
Paper #15	$14.00
Paper #20	$10.00

DISKS

Tandy SS 5 1/4 Disks	$9.00
Tandy DS 5 1/4 Disks	$10.00
Tandy DS 3 1/2 Disks	$28.00
Winners DS/DD W/Lib case	**$7.50**
Winners SS/DD W/Lib case	**$7.00**

====> *Minimum* <====

15% off Radio Shack Hardware

20% off Radio Shack Software

* 100% TANDY Warranty on TANDY products - Manufacturer's Warranty applies on all other items.
* FREE UPS shipping on orders over $50 (In the Continental US) - under $50 add $5 for shipping.
* The above prices are CASH prices - add 3% for credit cards. No COD's will be taken. Prices may be slightly higher in our retail stores.
* All returns must have prior authorization and are subject to a re-stocking fee.

HOWARD MEDICAL COMPUTERS

1690 N. Elston • Chicago, IL 60622 • ORDERS (800) 443-1444 • INQUIRIES AND ORDER STATUS (312) 278-1440
Showroom Hours 8-5 M-F, 10-3 SAT

★ 5 STAR FINAL FEBRUARY '89 VERY COLD

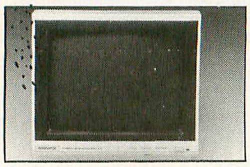
HMC CUTS 515 to $266

Hundreds of $ off Monitors sighted as Major Factor. HMC is reported to have made a special purchase on Magnavox monitors. These items, listed, are being offered at remarkable savings.

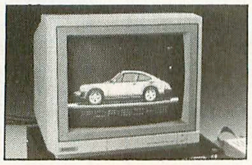
MAGNAVOX 7622 12″ Amber Screen offers 900 dots × 350 lines resolution at 20 MHz on a dark glass anti-glare CRT with built-in audio and 1 year warranty. ($7 shipping) **$88** 7652 green screen also available $88

MAGNAVOX 8 CM 515 has analog RGB for CoCo 3, TTL RGB for Tandy 1000 or IBM PC's, and composite color for CoCo 2 and 3. Built-in speaker. 14″ screen with 640 dot × 240 line resolution. Plus 2 years parts and labor warranty. reg. list $499 **was $298** **$266** + $14 Shipping

CC-3 Magnavox RGB cable only **$19.95** with Magnavox Monitor order. $29.95 w/o monitor.



7622



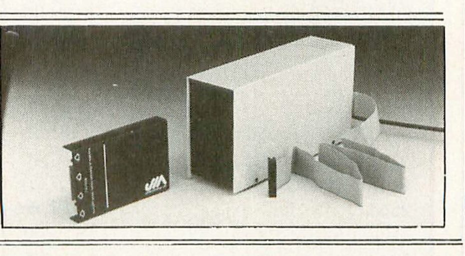
8CM515

123A

123A 12″ This 12″ green screen high resolution monitor offers 80 column capability, Zenith quality and a 90-day warranty valid at any of Zenith's 1200 locations. Retail $199. **Our price** **$67.50** ($7 shipping) **REPACK**

VA-1 for monochrome and color monitors delivers video interface for CoCo's 1 & 2 **$29.45** ($2 shipping)

DRIVE Ø +. ***Howards Drive Ø*** gives you a DD-3 MPI drive, a CA-1 cable and a HDS DC-5 Disk Controller for only **$178.45.** Double sided double density 360K. ($5 shipping) No charge for Disto DC-3 upgrade



HMC's Guarantee– A Promise you can take to the Bank.

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.

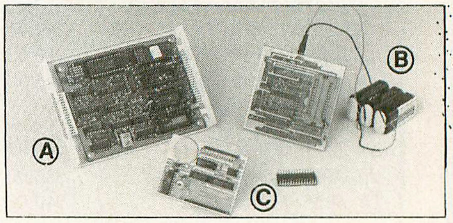
Price Break on DISTO Disk Controllers

Includes controller and C-DOS 4.0 ROM Chip. **DISTO $75** DC-3 [A] ($2 shipping on all DISTO products)

ADD-ON BOARDS

DC-3P Mini Eprom programmer includes all software to program 2764 or 27128 chips [B] **$55**

DC-3C Clock Calendar and parallel printer port [C] **$40**



RS-232 **$49.95**
Replaces R.S. RS-232 board. Plugs in drive port or multi pack. 2 MHz operation works with OS-9.($2 ship)

3 in 1 Board **$59.45**
Clock calendar at 2 MHz parallel printer port pack requires DISTO Controller or MEB ($2 ship)

MEB **$30** ($2 ship)
Plugs into multi pak to expand DISTO DC-3 bus. Use clock in DC-3 and eprom programmer in MEB.

24 HOUR ORDER LINE

DON'T MISS OUT,
DON'T MISS OUT, ORDER TODAY!

800 / 443-1444
WE ACCEPT VISA • MASTERCARD • AMERICAN EXPRESS • C.O.D. OR CHECKS • SCHOOL P.O.
NEW — DISCOVER CARD

Use our 800 number!

For credit card orders, you may want to phone in your subscription. Our *credit card order* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries please call (502) 228-4492.
We accept VISA, MasterCard and American Express.
Subscriptions to **THE RAINBOW** are $31 a year in the United States. Canadian rate is $38 (U.S. funds only). Surface rate elsewhere is $68 (U.S.). Airmail is $103 (U.S.). All subscriptions begin with the current issue. Please allow 6 to 8 weeks for the first copy. Kentucky residents add 5% sales tax.
In order to hold down non-editorial costs, we do not bill.

Our 800 number is also good for ordering RAINBOW ON TAPE or RAINBOW ON DISK!

Just call (800) 847-0309 anytime from 8 a.m. to 5 p.m. EST. *Credit card orders only.*
Subscriptions to **RAINBOW ON TAPE** are $80 a year in the United States, $90 (U.S. funds) in Canada and $105 (U.S.) in all other countries.
RAINBOW ON DISK is $99 a year in the United States, $115 (U.S.) in Canada and $130 (U.S.) in all other countries.
Individual issues of **RAINBOW ON TAPE** are $10 in the U.S., $12 (U.S.) in Canada and all other countries. Individual issues of **RAINBOW ON DISK** are $12 in the U.S., $14 (U.S.) in Canada, and $16 (U.S.) in all other countries. Kentucky residents please add 5% sales tax.
RAINBOW ON TAPE and **RAINBOW ON DISK** are not stand-alone products; you need the magazine for loading and operating instructions and the necessary documentation. **THE RAINBOW** magazine is a separate purchase.

Send Me Rainbow Magazine!

Which Tandy Color Computer do you use? ☐ CoCo 1 ☐ CoCo 2 ☐ CoCo 3

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year!

As the premier magazine for the Tandy Color Computer, **THE RAINBOW** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **THE RAINBOW** today!

YES! Sign me up for a year (12 issues) of **THE RAINBOW.**

☐ *NEW* ☐ *RENEW (attach label)*

Name __________

Address __________

City __________ *State* ______ *ZIP* ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number __________

Signature __________ Card Expiration Date ______

Give Your Fingers A Break!

YES! Sign me up: ☐ *NEW* ☐ *RENEW (attach label)*

☐ *RAINBOW ON TAPE* ☐ *RAINBOW ON DISK (Available beginning with the October 1986 issue)*

☐ *A Full Year* ☐ *Single Issue (specify month & year)* __________

Name __________

Address __________

City __________ State ______ ZIP ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number __________

Signature __________ Card Expiration Date ______

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY
POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY
POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

The Biggest
The Best
The Indispensable

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

THE RAINBOW is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! **THE RAINBOW** features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

A monthly issue contains nearly 200 pages and up to two dozen programs, 14 regular columns and as many as 12 new product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Hundreds of programs are advertised in its pages each month.

Every single issue of **THE RAINBOW** covers the wide spectrum of interests in the Tandy Color Computer — from beginners' tutorials and arcade games to telecommunications and business and finance programs. Helpful utilities and do-it-yourself hardware projects make it easy and fun to expand your CoCo's capabilities. And, monthly reviews by independent reader reviewers take the guesswork out of buying new software and hardware products.

Join the tens of thousands who have found **THE RAINBOW** to be an absolute necessity for their CoCo. With all this going for it, is it surprising that more than 90 percent of **THE RAINBOW** subscribers renew their subscriptions? We're willing to bet that, a year from now, you'll be doing the same.

Rainbow On Tape
& Rainbow On Disk!

— great ways to bring **THE RAINBOW** into your life. Each month, all you do is pop the tape into your cassette player or the disk into your drive. No more lost weekends. As soon as you read an article about a program in **THE RAINBOW**, it's ready to load and run. No work. No wait.

Just think how your software library will grow. With your first year's subscription, you'll get almost 250 new programs: games, utilities, business programs, home applications. And, with **RAINBOW ON DISK**, you'll also get all the OS-9 programs.

RAINBOW ON TAPE and **RAINBOW ON DISK** — they're the "meat" of **THE RAINBOW** at a price that's "small potatoes." And now you even have a choice about how it should be served up to you.

To get your first heaping helping, just fill out and return the attached reply card. No postage necessary.

nects the speaker-phone to the telephone line to answer an incoming call or to get a dial tone when a call is placed. Pulsing the relay simulates rotary dialing. Rotary dialing will work on both rotary and Touch-Tone (TM) telephone lines and eliminates the need to interface a Touch-Tone chip to the phone line. To simulate rotary dialing, it is necessary to open the telephone line at a rate of 10 pulses per second with 50 percent break. That means that for each pulse, the relay contacts must be closed 50 percent of the time and open the other 50 percent.

Bit 7 of Port A (PA7, $FF40) is used to blank the display unit when a function has been executed. Setting the bit high will blank the display. The 74LS04 inverts the signal to the 7447 to provide the low required for display blanking.

Bits 0 through 3 of Port B (PB0-PB3, $FF41) provide the BCD output to drive the display unit. Bits 4 through 7 (PB4-PB7, $FF41) are reserved for future expansion.

Bits 0 and 1 of Port C (PC0-PC1, $FF42) are used as inputs. Bits 2 through 7 are reserved. Although only two of the inputs are used to select and execute joystick functions, four are inverted by the 74LS04. Since the four inputs to the 74LS04 are tied high through the 4.7K resistors, the outputs to the PPI (PC0-PC3) are all held low for a no-signal condition. When the joystick is operated in either direction, the appropriate bit to the PPI (`EXEC` or `SEL`) will go high.

The Program

Let's look at the program and give you some ideas on how to write your own. The program shown in Listing 1 is the Pascal source code for the COEPP program. As you'll see shortly, Pascal was chosen to allow the program to automatically execute when power is applied to the computer. For BASIC, reading the radio receiver output is accomplished with peeks, while operating the peripheral equipment is accomplished with pokes. Understanding the Pascal source code will help you write a BASIC version.

Refer to Listing 1 for a brief explanation. Five constants are declared at the beginning of the program. The first one, `Phonenumber`, is the start address of the telephone number memory slots. Each slot is twelve bytes long, one byte for each digit. Unused bytes are poked with values greater than 10. The program uses the `Phonenumber` constant plus the slot number (0 through 9) to find the start address of the number you select. `PORTA`, `PORTB` and `PORTC` are assigned the addresses of the 8255 ports, while PPI is assigned the address of the 8255 internal register (`IREG`, $FF43).

Next all variables are declared. `LASTPORTA` is an eight-element Boolean array used to keep track of the last state of the eight bits of Port A ($FF40). If the selected bit is high, the array element will be true. If the bit is low, the array element will be false.

`CURRENTPORTA`, `LASTPORTB`, `LASTPORTC` and `LASTDISPLAY` keep track of the state of the three PPI port values and the current function number. `JOYSTK` stores the results of reading the radio receiver output.

The program actually begins at the `BEGIN` statement. First, the program initializes program variables. Then the `PPI IREG` is loaded with Decimal 129 to set up the input and output ports of the 8255 PPI. `PORTA` is loaded with zero to turn everything off, and `PORTB` is loaded with 1 to display the first function number.

The next section of the program reads

CoCo 3 Owners! Still using just RS-DOS?

NO MORE EXCUSES!

Start OS-9

An Enjoyable, Hands-On Guide To
OS-9 Level 2 On the Color Computer 3

By Paul K. Ward

At Princeton RAINBOWfest, we sold out of our show stock. Then we sold out of the ENTIRE First Edition. Now, GET THE LATEST, the SECOND EDITION !

NEW -- **Exclusive Delphi Sign-up Offer:** One hour free on-line time ($7.20 value!) and free "Delphi: The Official Guide"
MORE -- More examples than before! More pages!
STILL INCLUDES -- Articles by Dale Puckett, Marty Goodman, Bill Brady, and Kevin Darling!
ADDED VALUE -- free disk with hands-on examples and lightning-fast utilities from Steve Goldberg!

Requires 512K CoCo 3, OS-9 Level 2, two disk drives, and 80-column monitor

Kenneth-Leigh Enterprises is proud to announce an exclusive arrangement with Stephen Goldberg to distribute his famous OS-9 utilities. For pros and novices.

The Goldberg Utilities, Volume 1
From FBN Software

Includes 15 utilities: *Append, Cls, Copy, Count, D, Grep, Lower, Upper, Sort, Zcopy* and others
Sorry, *Dsort* is not available at this time -- sorry for any inconvenience!

"Start OS-9: An Enjoyable Hands-On Guide -- $32.95 US
"The Goldberg Utilities, Volume 1" -- $24.95 US
Our famous "NO MORE EXCUSES -- Start OS-9" T-shirt -- $8.95 US
Please add $2.50 S/H Personal checks, major credit cards, money orders welcome.

Kenneth-Leigh Enterprises 1840 Biltmore Street NW Suite 10
Washington DC 20009 202/232-4246 9:30 - 6:30 EST

TANDY COMPUTER DISCOUNTS

COLOR COMPUTERS

26-3334 CoCo 3	165.00
26-3215 CM-8 color monitor	259.95

PRINTERS

26-2802 DMP 106	179.95
26-2808 DMP 440	599.00
26-2814 DMP-132	299.95

Complete line of Tandy (Daisy Wheel) print wheels

MSDOS COMPUTERS

25-1053 TANDY 1000 HX	599.00
25-1401 TANDY 1000 SL	799.00
25-1601 TANDY 1000 TL	1,050.00
25-4072 TANDY 3000 NL	1,500.00
25-1023 CM-5 color monitor	249.95
25-1020 VM-4 Monochrome monitor	110.00

We Carry the Complete Line of Tandy Computer Products at Discount Prices

CALL FOR A FREE PRICE LIST 800-257-5556
IN N.J. CALL 609-769-0551

WOODSTOWN ELECTRONICS
Rt. 40 E. WOODSTOWN, N.J. 08098

Program Name	Version	Start Address	End Address	Execute Address	Start Address of Tel. #
COEPPRAM/BIN	RAM	$3000	$4878	$3000	$4800
COEPPROM/BIN	ROM	$C000	$D878	$C000	$D800

Figure 10: Program Memory Requirements

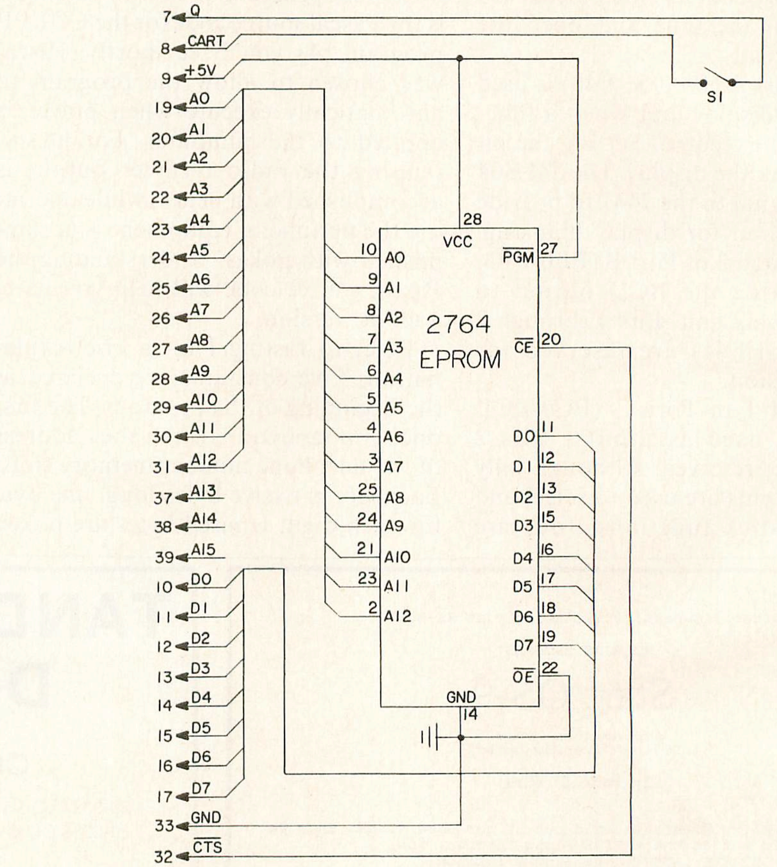


Figure 11: EPROM Circuit

the telephone number memory slots and displays the phone numbers on the optional TV screen. Next comes the main program loop. The program will loop through this section until the computer is reset or power is turned off. The comments explain what the program is doing, so it isn't necessary to go into great detail here. There are a couple of things I'd like to explain, though.

First, the software compensates for the inequities of the radio and relay drivers by reading the receiver output 75 consecutive times to ensure that the signal is valid. After a valid read is completed, the program loops for 15,000 instruction cycles to allow the receiver ample time to settle down.

The second explanation is about dialing. A zero on the telephone dial or button is actually equal to 10 and is stored as such in the computer memory. The program dials 10 pulses but displays a zero. Two program loops are used to complete dialing. The first loop is executed once for each pulse required. The number six requires six pulses, so the loop is executed six times. The second loop is a time-delay loop, which is executed for the remainder of the ten pulses. In the above example, the second loop is executed four times (i.e., 10-6=4). This allows all digits dialed to be shown on the display unit an equal length of time.

The telephone numbers are stored in memory at the end of the compiled program by poking telephone number digits into consecutive memory addresses in RAM. For the EPROM version shown, the program starts at Address $C000 and the telephone numbers at $D800. For an all-RAM version, you can load the program at $3000 and the telephone numbers at $4800. Make sure you change the `Phonenumber` constant in the program source code.

If the program is burned into ROM, you must poke the telephone numbers into memory before burning the ROM chip. Each phone number is allowed 12 bytes of memory. Unused bytes will contain values greater than 10. Zeroes are always stored as 10s and displayed as zeros.

Two versions of the compiled program are provided for RAINBOW ON TAPE and RAINBOW ON DISK. Figure 10 lists the program addresses for each version.

Auto Execute

Because the system was designed for disabled persons, it wouldn't make sense for the user to have to load system software from tape or disk. So the logical choice is to program an EPROM chip in machine language and have the computer execute the program every time the reset button is pressed or the power is turned on. That's why *Pascal* was chosen. The program can be loaded anywhere into memory, so it's ideal for an EPROM.

Figure 11 shows the EPROM circuit for a CoCo. IC1 is a 2764, 8K-by-8-bit EPROM that is connected to the CoCo ROM port. Pins 7 and 8 of the ROM port are tied together through Switch S1. When S1 is closed, the program will automatically execute on reset or power up. When S1 is open, the computer functions in the normal fashion and the program can be executed by typing `EXEC 49152` and pressing ENTER. For those who wish to use all ROM memory available, refer to the schematic of the Static RAM Interface circuit on Page 152 of the May '88 issue of THE RAINBOW. This circuit is directly compatible with 2764 EPROMs, and you can replace the SRAMs of the SRI circuit with 2764 EPROMs. If you want to program an EPROM but don't have an EPROM programmer, ask your local CoCo club for assistance.

(Questions or comments regarding this project may be directed to the author at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when requesting a reply.) ☐

Announcing a Great New Floppy Drive System for the Color Computer:

The New OWL-Ware Floppy Drive System

No Better System is Available at Any Price (But the Price is Great, too!)
Two New Products First Shown at Rainbowfest, Princeton 1988

DISK CONTROLLER

We at OWL-WARE are pleased to announce that we have purchased the rights to all of the Color Computer Products of J&M Systems. J&M has had more experience with CoCo controllers than any other supplier (except for Radio Shack® itself) and we are proud to add them to our nest! OWL-WARE will now be producing J&M controllers under the OWL brand. These controllers all use J&M's proven designs, with some minor improvements, and they will serve you for years to come.

- All gold contacts
- Works with all CoCo models (1,2,3)
- Holds 2 switchable ROMS
- Positive switching by simple jumper or optional external switch (No erratic software or pokes required)
- Buffered I/O lines to help prevent burn-out if unit accidentally pulled out with the system on
- Latching chips are socketed to speed repairs
- Does not use the WD1773 chip which caused problems with many CoCo 3 systems and is now discontinued
- Attractive all metal case
- Dealer inquiries now invited

CONTROLLER only $69.
(without ROMs)

(Add $14.95 for RSDOS
$19.95 RSDOS and OWLDOS)

See the next 2 pages for more drive and software specials from OWL-WARE

COMPUTER
CAUTION
TURN OFF POWER BEFORE REMOVING OR INSERTING
OWL CONTROLLER
DISC DRIVE
OWL
DRIVE SYSTEM

Disk drives are not our only business, but they sure are our main business! We have been selling hard and floppy drives for the CoCo longer than any other Rainbow advertiser. **Our double sided drives are brand new, half-heights with a full one year warranty!** The full-height drives offered cheap by our competition are *used or surplus!*

NEW! Keyboard Interface for the CoCo!

At last you can type on a real IBM® type professional computer keyboard. You can use the keyboard in your lap or a comfortable table and/or 6 to 12 feet from the CoCo. This interface allows the use of both user programmable function keys and programmed "quick keys". The cursor pad and the number keypad function like an IBM®. An on board ROM provides for different programmed keys for BASIC and OS-9. Easy to install and no soldering is required. Probably the most useful and pleasant addition to your CoCo and is much better than any keyboard extension or add-on keyboard. Includes easy to follow instructions. Use with any standard IBM® style keyboard or use ours.

Interface $119. **101-Key Keyboard only $45.**

CASE AND POWER SUPPLY

In recent months it has become very difficult to obtain dependable, safe power supply and cases for floppy drive systems. They just couldn't pass our quality control. OWL-WARE has now produced a case and power supply that you can be proud to own and use. We believe that this is the best and most attractive drive case available for any computer.

- Built in surge protector! (we believe that this feature is unique in CoCo drive cases)
- Sleek, modern design
- Heavy-duty power supply
- Fully shielded data cable
- Modular power supply construction for ease of repairs
- Stackable case design
- Dealer inquiries now invited

SPECIAL WINTER SALE
Double Sided Drives
Drive 0 System
Complete $199.
Drive 1
Only $129.

More →

OWL-WARE
P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

OWL-WARE

Proven

On the Razor's Edge of

Basic and OS-9 Hard Drive Systems

Proven Performance for Demanding Home or Business Users

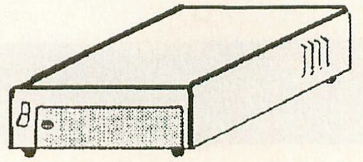
Every hard drive which has been produced by OWL-WARE during the last 3 years is **complete**. A system consists of software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. There are no hidden costs for assembly or testing. When a drive system is ordered, we fully **assemble**, **test**, and **burn-in** the system for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for more than 3 years. This is the longest history in the CoCo market of any system. Some other advertisers are stating that they have one of the most reliable systems for the CoCo *with all of 4 months history in the CoCo hard drive market*! We have reached our position in the hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

Because of many requests for a lower price system in kit form, we are now selling a kit of all parts at a significant discount compared to our regular prices. We recommend this kit (or any kits offered by any other supplier) only to those who have experience in electronic assembly and OS-9.

We have **LR Tech** and **Burke & Burke**

For OS-9 Levels 1 and 2



	10 Meg.	20 Meg.	40 Meg.	80 Meg. (2 X 40 Meg.)
System Prices: (Includes Hard Drive, Controller, LR Tech Interface, Software. Fully assembled and tested.)	$469.	$599.	$725.	$1,069.
Kit Prices: (LR Tech System as above but not assembled or tested.)	$419.	$549.	$659.	$ 999.
Kit Prices: (As above but using Burke & Burke bus adapter)	(na)	$489.	$609.	(lower prices)

30 Meg Kit: **$539.** (Lowest prices anywhere)

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 3 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

The table below will summarize some of the key points about our BASIC hard drive system and the B&B system. We believe that we have the best BASIC interface for CoCo hard drives available.

BASIC Hard Drive Systems*

Feature	OWL	B&B
Drive Portion Available at One Time	Entire	Partial (4 sections)
User Sets BASIC/OS-9 Partitions	YES	Yes
Add to Existing OS-9 Drive Without Reformat	YES	No(?)
Drives 0-3 Hard/Floppy	YES	No
Built in Park	YES	No
Speed*	FAST	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but both systems are fast and we sell both. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

Prices: With/Without Hard Drive

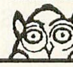
$35./$79.

Technology

the Color Computer Frontier

DISK DRIVES

Bonus!
Special
Bundled
Software
with any
Disk Drive
Purchase!



Floppy Drive Systems

The Highest Quality for Years of Service

(We have located a number of unused, surplus single sided drives for those who wish a quality, inexpensive system.)

Drive 0 Systems (Half Height, Double Sided, Direct Drives) **$199.** (Same but Single sided) **$185**

Drive 0 systems complete with drive, controller, legal DOS, cable, case, power supply, and manual

Drive 1 Systems (Half Height, Double Sided, Direct Drives) **$129.** (Same but Single sided) **$115.**

New 3.5", 720K Drives for OS-9 with case & Power Supply **$179.**

Drive 1 Systems have drive, case, power supply. (You may require optional cable and/or DOS chip to use)

Special for 0/1 Combos (Drives 0,1,2,3) $295.

HALF-HEIGHT DRIVE UPGRADES FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model 500	Model 501 or 502
$119.	$129.

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)
1-800-245-6228
1-215-682-6855

Technical Help
1-215-837-1917

OWL WARE Software Bundle

Disk Tutorial/Utilities/Games

DISK TUTOR Ver 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs to copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

2 GAMES

We will select 2 games from our stock. These sold for more than $20 each.

If sold separately this is more than $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with
any Disk Drive Purchase!!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

OWL-WARE
P.O. BOX 116
Mertztown, PA 19539

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

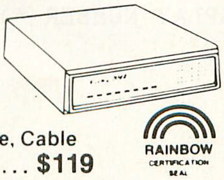
For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

Listing 1: `COEPPRAM`

```
PROGRAM COEPP(INPUT,OUTPUT);

(* COEPP VERSION 1.0  NOV. 6,1987 *)
(*   WRITTEN BY DENNIS H. WEIDE    *)
(*         COPYRIGHT 1987          *)
(*      THIS VERSION IS FOR        *)
(*        16K STATIC RAM           *)

CONST PHONENUMBER=$E000;
      PORTA=$FF40;
      PORTB=$FF41;
      PORTC=$FF42;
      PPI=$FF43;

VAR LASTPORTA:ARRAY[1..8] OF BOOLEAN;
    CURRENTPORTA,
      LASTPORTB,
       LASTPORTC,
        LASTDISPLAY,
         NUMBER,SCRAP,JOYSTK,A,B,C,D,E,F,G,H:INTEGER;
    DUMMY,ANSWER:STRING(12);

BEGIN
  PAGE;
  FOR A:=1 TO 8 DO LASTPORTA[A]:=FALSE;
  CURRENTPORTA:=0;
  LASTDISPLAY:=1;
  BYTE[PPI]:=129;
  BYTE[PORTA]:=0;
  BYTE[PORTB]:=LASTDISPLAY;
  WRITELN('TELEPHONE BOOK');
  WRITELN('--------------');
  FOR A:=0 TO 9 DO BEGIN
    SCRAP:=PHONENUMBER+(12*A);
    WRITE('#',A:1,'  ');
    FOR B:=1 TO 12 DO BEGIN
      C:=BYTE[SCRAP];
      IF C=10 THEN C:=0;
      IF C<11 THEN WRITE(C:1);
      SCRAP:=SUCC(SCRAP);
    END; (*FOR*)
    WRITELN;
  END; (*FOR*)
  CURSOR(448);
  WRITE('ADD PHONE NUMBERS (Y/N)?');
  READLN(ANSWER);
  WHILE ANSWER='Y' DO BEGIN
    CURSOR(448);
    WRITELN;
    CURSOR(448);
    WRITE('ENTER PAGE NUMBER (0-9)>');
    READLN(NUMBER);
    CURSOR(448);
    WRITELN;
    CURSOR(448);
    WRITE('ENTER PHONE NUMBER >');
    READLN(ANSWER);
```

```
      ANSWER:=ANSWER+'************';
      SCRAP:=PHONENUMBER+(12*NUMBER);                (*FIND START ADDR OF PHONE
  BUFFER*)
      FOR B:=1 TO 12 DO BEGIN
        STRINGCOPY(ANSWER,B,1,DUMMY);
        C:=ENCODE(DUMMY);
        IF DUMMY='*' THEN C:=255;
        IF C=0 THEN C:=10;
        BYTE[SCRAP]:=C;
        SCRAP:=SUCC(SCRAP);
      END; (*FOR*)
      SCRAP:=PHONENUMBER+(12*NUMBER);
      CURSOR((NUMBER*32)+68);
      REPEAT
        A:=BYTE[SCRAP];
        IF A=10 THEN A:=0;
        IF A<11 THEN WRITE(A:1);
        SCRAP:=SUCC(SCRAP);
      UNTIL A>10;
      WRITE('              ');
      CURSOR(448);
      WRITELN;
      CURSOR(448);
      WRITE('ENTER ANOTHER NUMBER (Y/N)?');
      READLN(ANSWER);
    END; (*WHILE*)

  (* MAIN PROGRAM LOOP *)
```



CINSOFT
PROGRAMS • PERIPHERALS • SUPPLIES • SERVICE

Fast Delivery...
Friendly Service

Now in our 7th year!

Avatex Modems

*** NEW LOW PRICES ***

Avatex 1200e	$79	Avatex 2400	$169
with Coco Cable	89	with Coco Cable (Coco 3 only)	179
		with RS-232 Cable*	205

Reviewed in April, 1988 Rainbow!

Avatex 1200e, Cable AUTOTERM ... $119

RAINBOW CERTIFICATION SEAL

Avatex 2400, Cable AUTOTERM ... $209

*Coco 1, 2 requires Deluxe RS-232 Pak

• Call • 513-396-SOFT

• Shop by Modem • 513-396-SHOP

VISA MasterCard AMERICAN EXPRESS

2235 Losantiville, Cincinnati, OH 45237
SHIPPING will be charged at our ACTUAL COST
Ohio residents add 5.5% Sales Tax COD add 2.50

OS9 POWER OS9 POWER OS9 POWER OS9 POWER OS9 POWER

Move into the Forefront of Power with 4MOST!

Release the full potential of OS9! Imagine being able to use WILDCARDS on any command line. This is only one of the benefits you will enjoy with our professional shell. You get four powerful programs designed to make using OS9 Level I and Level II even easier!

SHELL
Replaces existing shell. Wildcard substitution *anywhere* in the pathlist - works with existing programs! Pass parameters to procedure files. Includes more built-in shell commands.

COPY
More versatile than old copy command. Copy one or more files to a directory. Sort files, overwrite existing files, or copy only newest versions.

MOVE
Reorganize your files. Uses same options as COPY. Optimized for speed! Also replaces OS9 **RENAME**.

PRINT
Get neat, organized printouts every time! Provides headers with date and time; numbered pages; set length, width, margins, and title. Complete control of all features!

Get 4MOST! - ONLY **$24.95 US** (+$2 shipping).
SATISFACTION GUARANTEED!

Send cheque or money order payable to:

MAGUS SYSTEMS ENGINEERING
33A Woodvale Green,
Nepean, Ontario, CANADA
K2G 4H3

OS9 POWER OS9 POWER OS9 POWER OS9 POWER OS9 POWER

```
      CURSOR(448);
      WRITELN;
      WHILE TRUE DO BEGIN
        JOYSTK:=BYTE[PORTC];                      (* READ JOYSTK FOR *)
        A:=JOYSTK AND 3;                          (* INPUT REQUEST   *)
        C:=1;                                     (* IGNORE ALL BITS *)
        FOR SCRAP:=1 TO 75 DO BEGIN               (* EXCEPT 0 AND 1. *)
          JOYSTK:=BYTE[PORTC];                    (* READ JOYSTK 75  *)
          B:=JOYSTK AND 3;                        (* TIMES TO ENSURE *)
          IF B=A THEN C:=SUCC(C);                 (* THAT THIS IS A  *)
        END; (*FOR*)                              (* VALID REQUEST.  *)
        IF C<>SCRAP THEN A:=0;
        CASE A OF
          1:BEGIN                                 (* IF INPUT=1, THEN  *)
            LASTDISPLAY:=SUCC(LASTDISPLAY);       (* INCREMENT DISPLAY *)
            IF LASTDISPLAY>9 THEN LASTDISPLAY:=1;
            BYTE[PORTB]:=LASTDISPLAY;
            FOR SCRAP:=1 TO 15000 DO ;            (* DELAY PROGRAM SO  *)
          END; (*BEGIN*)                          (* IT WON'T RUN AWAY *)
          2:BEGIN
            CASE LASTDISPLAY OF
          1:SCRAP:=1;                         (* SET BITS TO REQUIRED VALUES
*)
          2:SCRAP:=2;                         (* TO TOGGLE OUTLETS OR RELAYS
*)
          3:SCRAP:=4;
          4:SCRAP:=8;
          5:SCRAP:=16;
          6:SCRAP:=32;
          7:BEGIN                             (* GIVE OFF-HK AND DIAL OUT *)
            NUMBER:=0;
            BYTE[PORTB]:=NUMBER;              (* SET DISPLAY TO ZERO *)
            FOR SCRAP:=1 TO 15000 DO ;
            D:=0;
            WHILE D<2 DO BEGIN                (* READ JOYSTK TO DETERMINE  *)
              JOYSTK:=BYTE[PORTC];            (* IF DIALLING OR SELECTING  *)
              D:=JOYSTK AND 3;                (* NUMBER.                   *)
              F:=1;
              FOR SCRAP:=1 TO 75 DO BEGIN     (* READ 75 CONSECUTIVE TIMES *)
                JOYSTK:=BYTE[PORTC];          (* TO DETERMINE IF REQUEST   *)
                E:=JOYSTK AND 3;              (* IS VALID.                 *)
                IF E=D THEN F:=SUCC(F);
              END; (*FOR*)
              IF F<> SCRAP THEN D:=0;
              CASE D OF
                1:BEGIN                       (* ADVANCE DISPLAY NUMBER *)
                  NUMBER:=SUCC(NUMBER);
                  IF NUMBER>9 THEN NUMBER:=0;
                  BYTE[PORTB]:=NUMBER;
                  FOR SCRAP:=1 TO 15000 DO ;
                END; (*BEGIN*)
                2:BEGIN                             (* DIAL NUMBER *)
                  BYTE[PORTA]:=CURRENTPORTA+192;     (* GIVE OFF-HK *)
                  FOR SCRAP:=1 TO 30000 DO ;        (* WAIT FOR DIAL TONE *)
                  SCRAP:=PHONENUMBER+(12*NUMBER);   (* FIND START  *)
                  FOR G:=1 TO 12 DO BEGIN           (* READ 12 NUMBERS AND *)
                    E:=BYTE[SCRAP];
                    IF E<11 THEN BEGIN              (* DIAL ONLY IF NUMBER *)
                      IF E=10 THEN BYTE[PORTB]:=0   (* EQUALS 1 TO 10. IF  *)
                        ELSE BYTE[PORTB]:=E;        (* NUMBER=10, DISPLAY  *)
                      FOR F:=1 TO E DO BEGIN        (* A ZERO              *)
                        BYTE[PORTA]:=CURRENTPORTA;      (* ON HOOK *)
                        FOR H:=1 TO 1000 DO ;
                        BYTE[PORTA]:=CURRENTPORTA+64;   (* OFF HOOK *)
                        FOR H:=1 TO 1000 DO ;
                      END; (*FOR*)
                      FOR F:=1 TO 10-E DO FOR H:=1 TO 1000 DO ;
                      BYTE[PORTA]:=CURRENTPORTA+192;
                      FOR H:=1 TO 10000 DO ;
                    END; (*IF*)
                    SCRAP:=SUCC(SCRAP);
                  END; (*FOR*)
                  CURRENTPORTA:=CURRENTPORTA+64;    (* UPDATE PORTA FOR OFF-HK
*)
                  BYTE[PORTA]:=CURRENTPORTA+128;    (* DELETE THIS LINE IF TBL
*)
                  LASTDISPLAY:=8;                   (* SET DISPLAY TO 8 FOR
*)
                  BYTE[PORTB]:=LASTDISPLAY;         (* DISCONNECT (ON-HK)
*)
                  FOR SCRAP:=1 TO 15000 DO ;
                END (*WHILE*)
              END; (*CASE*)
            END; (*WHILE*)
```

Are you having trouble learning machine language?
Are you tired of depending on Basic subroutines?
Then this program is for you:

ROOTS

A machine language source file with over 100 subroutines. You can easily append it to your own source files and be free of Basic. You can send characters to the screen or printer, read and write sectors to disk, convert registers into ASCII numbers, generate sound, create and read disk files, transfer data through a modem, generate random numbers, put ASCII characters on hi-res screens, read joysticks, INPUT strings and numbers, use 32/40/64/80 columns, and many more. On the CoCo III you can use the extra keys, speed, graphics, and memory. Best of all, you can change Roots to fit your needs and learn more about machine language. Most routines work on a CoCo II. Disk only. $25

DIASM

A powerful disassembler that can disassemble files even if they overlap Diasm or Basic. You can print the entire file or part of it. Editing features include: find, insert, and delete a byte; toggle between decimal and hexadecimal base; jump to an address, and much more. Works with auto-executing programs. Many other features. CoCo I, II, or III, disk only. $20

OMNI UTILITY

The ultimate CoCo III disk file-handling utility program. An on-screen directory allows you to copy, kill, list, execute, display information about, and rename files at the touch of a key. You can also alphabetize and move directory entries, and format, backup, verify, and print the directory of disks. There is a full-featured sector editor, and other features. $20

GAT BACKUP

The ultimate CoCo III disk backup utility. It gives you the options to backup the entire disk, a section, or only the granules in use. It makes multiple copies, and copies 35 tracks in two passes -- fast. It formats and gives directories. $15

JUBILEX

A fast-paced game that requires skill and quick thinking. Pilot your ship over the planet Jubilex. Avoid cannon shots and rockets from the ground while you battle their aircraft. You can modify and improve your weapon system. Requires joystick, CoCo III, and disk drive. $25

All programs are 100% machine language. For an extra $5 you can get the **source file** with the program (price of ROOTS includes source file). We pay shipping and sales tax. Write for more information, or send check or money order to:

GSW Software
8345 Glenwood
Overland Park, KS 66212

BEST

WE'VE CHOSEN THE BEST OF OVER 760 PROGRAMS (OVER 6 YEARS OF ACCUMULATING FINE SOFTWARE), AND PACKAGED THEM FOR YOU. 12 PROGRAMS EACH PACKAGE. COLOR COMPUTER I, II or III. SPECIFY TAPE OR DISK. ONLY **$29.95 EACH PACKAGE!** 5 NEW ONES!

#1 Home Mgmt I
- Budget
- Checkbook Balancer
- Cost of Living
- Tinycalc Spreadsheet
- Electronic Datebook
- Account Manager
- Stock Market
- Word Processor
- Lottery Analyst
- Coco Database
- Coco Terminal
- Bartender

#2 Education
- Flash Card
- Spanish Lessons
- Typing Tutor
- Creativity Test
- Arith. Football
- Cost of Living
- Math Tutors 1, 2
- Trigonometry Tutor
- Typing Game
- Word Tests
- Talking Alphabet
- Clown Dunk Math

#3 Adventures II 'NEW'
- Dungeon Master
- Hired, Tired, Fired
- Iceworld
- Jungle
- Keys
- Amulet of Power
- The Trip
- Cookies
- Barracks
- Genesis Project
- Rambo
- Zigma Experiment

#4 Business Helper DISK ONLY
- Workmate
- Word Processor
- Spreadsheet
- Calendar
- Accounts Receivable
- Accounts Payable
- Income Property
- Mail List
- Small Business Helper
- Stock Charting
- Job Log
- Asset Manager

#5 Games III 'NEW'
- Sandy Rover
- Gray Lady
- Flippy The Seal
- Abie Builders
- Panzer
- Mrs. Pac
- Fire Runner
- Cosmic Rays
- Dig
- Battle Tank
- Kron
- King Pede

#6 Electronics Tutorial 'NEW'
- Electronics 1 + 2
- Electronics 3 + 4
- Electronics 5 + 6
- Electronics 7 + 8
- Electronics 9 + 10
- Electronics 11 + 12
- Electronics 13
- Electronics 14
- Electronics 15
- Electronics 16
- Electronics 17
- Electronics 18

#7 Machine Lang. Tut.
- Basic Compiler
- ML Tutorial Pt. 1
- ML Tutorial Pt. 2
- ML Tutorial Pt. 3A, 3B
- ML Tutorial Pt. 4
- ML Tutorial Pt. 5
- ML Tutorial Pt. 6
- ML Tutorial Pt. 7
- ML Tutorial Pt. 8
- MLT Dictionary
- Coco Technical Look
- Coco Technical Look Pts. 1-3

#8 Gamble Issue 'NEW'
- Horse Racing
- Rack Track
- Black Jack
- Slot Machine
- Lottery Analyst
- Coco Keeno
- Lucky Money
- Betting Pool
- Baccarat
- Draw Poker
- Turtle Races
- Hi-Lo Craps

#9 Coco 3 Only 'NEW'
- Paint Coco 3
- Convert Coco 3
- Demon's Castle
- Function Keys
- Bowling 3
- Coco 3 ➧ Coco 2
- Wizard
- Coco 3 Drawer
- H-Res Chess
- FYR-Draca 3
- Whammy 3
- Coco 3 Screen Print

RAINBOW CERTIFICATION SEAL

MasterCard VISA T&D

29⁹⁵ EACH SET
★ Special This Month ★
Buy 2 Packages and get 1 FREE

TURN TO PAGES 41 & 137 FOR A COMPLETE LISTING OF ALL OUR PROGRAMS.

T & D Subscription Software • 2490 Miles Standish Dr. • Holland, MI 49424 • (616) 399-9648

```
            SCRAP:=0;
          END; (*BEGIN*)
          8:SCRAP:=64;                               (* OFF-HK OR ON-HK *)
          9:BEGIN
            CURRENTPORTA:=0;
            BYTE[PORTA]:=CURRENTPORTA;
            FOR SCRAP:=1 TO 8 DO LASTPORTA[SCRAP]:=FALSE;
          END (*BEGIN*)
        END; (*CASE*)
        IF (LASTDISPLAY<>7) AND (LASTDISPLAY<9) THEN BEGIN
          IF LASTPORTA[LASTDISPLAY]=FALSE THEN BEGIN
            CURRENTPORTA:=CURRENTPORTA+SCRAP;        (* CALCULATE NEW PORT *)
            BYTE[PORTA]:=CURRENTPORTA;               (* VALUE              *)
            LASTPORTA[LASTDISPLAY]:=TRUE;            (* SET FLAG           *)
          END (*IF*)
          ELSE BEGIN
            CURRENTPORTA:=CURRENTPORTA-SCRAP;        (* CALCULATE NEW PORT *)
            BYTE[PORTA]:=CURRENTPORTA;               (* VALUE              *)
            LASTPORTA[LASTDISPLAY]:=FALSE;           (* RESET FLAG         *)
          END; (*ELSE*)
        END; (*IF*)
        FOR SCRAP:=1 TO 3 DO BEGIN                   (* BLINK THE DISPLAY  *)
          BYTE[PORTA]:=CURRENTPORTA+128;             (* AFTER EXECUTING    *)
          FOR C:=1 TO 8000 DO ;                      (* COMMAND            *)
          BYTE[PORTA]:=CURRENTPORTA;
          FOR C:=1 TO 8000 DO ;
        END; (*FOR*)
        FOR SCRAP:=1 TO 15000 DO ;
      END (*BEGIN*)
    END; (*CASE*)
  END (*WHILE*)
END. (*BEGIN*)
```

Listing 2: `COEPPROM`

```
PROGRAM COEPP(INPUT,OUTPUT);

(* COEPP VERSION 2.0 NOV. 21,1987 *)
(*   WRITTEN BY DENNIS H. WEIDE   *)
(*         COPYRIGHT 1987         *)
(*   THIS VERSION IS FOR 8K ROM   *)

CONST PHONENUMBER=$D800;
      PORTA=$FF40;
      PORTB=$FF41;
      PORTC=$FF42;
      PPI=$FF43;

VAR LASTPORTA:ARRAY[1..8] OF BOOLEAN;
    CURRENTPORTA,
      LASTPORTB,
       LASTPORTC,
        LASTDISPLAY,
         NUMBER,SCRAP,JOYSTK,A,B,C,D,E,F,G,H:INTEGER;
    DUMMY,ANSWER:STRING(12);
```

Corrections

"News Flash! News Flash!" (December 1988, Page 92): To make the program run more efficiently the following corrections to `NEWSREEL` were submitted by the author. Add a semicolon to the end of Line 50. Delete Line 70. Also, change the word *increase* in the last sentence of the text to *decrease*.

"Received & Certified" (November 1988, Page 139): The program *The Answer* was incorrectly described as working only on the CoCo 3. *The Answer* works on all versions of the Color Computer.

"Bingo the CoCo Way" (August 1988, Page 38): In order to allow `BINGOTLK` to work properly on a tape-only system, readers should change each occurence of the

(*continued on Page77*)

```
BEGIN
  PAGE;
  FOR A:=1 TO 8 DO LASTPORTA[A]:=FALSE;
  CURRENTPORTA:=0;
  LASTDISPLAY:=1;
  BYTE[PPI]:=129;
  BYTE[PORTA]:=0;
  BYTE[PORTB]:=LASTDISPLAY;
  WRITELN('TELEPHONE BOOK');
  WRITELN('--------------');
  FOR A:=0 TO 9 DO BEGIN
    SCRAP:=PHONENUMBER+(12*A);
    WRITE('#',A:1,' ');
    FOR B:=1 TO 12 DO BEGIN
      C:=BYTE[SCRAP];
      IF C=10 THEN C:=0;
      IF C<11 THEN WRITE(C:1);
      SCRAP:=SUCC(SCRAP);
    END; (*FOR*)
    WRITELN;
  END; (*FOR*)
  CURSOR(448);

(* MAIN PROGRAM LOOP *)

  WRITELN;
  WHILE TRUE DO BEGIN
    JOYSTK:=BYTE[PORTC];                      (* READ JOYSTK FOR *)
    A:=JOYSTK AND 3;                          (* INPUT REQUEST   *)
    C:=1;                                     (* IGNORE ALL BITS *)
    FOR SCRAP:=1 TO 75 DO BEGIN               (* EXCEPT 0 AND 1. *)
      JOYSTK:=BYTE[PORTC];                    (* READ JOYSTK 75  *)
      B:=JOYSTK AND 3;                        (* TIMES TO ENSURE *)
      IF B=A THEN C:=SUCC(C);                 (* THAT THIS IS A  *)
    END; (*FOR*)                              (* VALID REQUEST.  *)
    IF C<>SCRAP THEN A:=0;
    CASE A OF
      1:BEGIN                                 (* IF INPUT=1, THEN  *)
        LASTDISPLAY:=SUCC(LASTDISPLAY);       (* INCREMENT DISPLAY *)
        IF LASTDISPLAY>9 THEN LASTDISPLAY:=1;
        BYTE[PORTB]:=LASTDISPLAY;
        FOR SCRAP:=1 TO 15000 DO ;            (* DELAY PROGRAM SO  *)
      END; (*BEGIN*)                          (* IT WON'T RUN AWAY *)
      2:BEGIN
        CASE LASTDISPLAY OF
          1:SCRAP:=1;                         (* SET BITS TO REQUIRED VALUES
*)

          2:SCRAP:=2;                         (* TO TOGGLE OUTLETS OR RELAYS
*)

          3:SCRAP:=4;
          4:SCRAP:=8;
          5:SCRAP:=16;
          6:SCRAP:=32;
          7:BEGIN                             (* GIVE OFF-HK AND DIAL OUT *)
            NUMBER:=0;
            BYTE[PORTB]:=NUMBER;              (* SET DISPLAY TO ZERO *)
            FOR SCRAP:=1 TO 15000 DO ;
```

number `3584` to the phrase `PEEK(188)*256` in lines 5, 100 and 105.

"CoCo's Current Companion" (July 1988, Page 34): Marc Campbell, author of `BUDDY`, has supplied the following corrections: First in Line 51, `GOTO106` should be changed to `GOTO105`. In Line 73, the formula `EE=LL((Q-S)/249)-1` should be changed to `EE=LL((Q-S)/250)-1`. The tape merge routine at the end of the article should read `OPEN"I",#-1` instead of just `OPEN#-1`. Finally, if you have experienced lock-up when an error is encountered, add `LOCATE0,0:PRINT:` to the beginning of Line 48.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG> prompt and `INFO` at the TOPIC> prompt.

```
            D:=0;
            WHILE D<2 DO BEGIN                (* READ JOYSTK TO DETERMINE  *)
              JOYSTK:=BYTE[PORTC];            (* IF DIALLING OR SELECTING  *)
              D:=JOYSTK AND 3;                (* NUMBER.                   *)
              F:=1;
              FOR SCRAP:=1 TO 75 DO BEGIN     (* READ 75 CONSECUTIVE TIMES *)
                JOYSTK:=BYTE[PORTC];          (* TO DETERMINE IF REQUEST   *)
                E:=JOYSTK AND 3;              (* IS VALID.                 *)
                IF E=D THEN F:=SUCC(F);
              END; (*FOR*)
              IF F<> SCRAP THEN D:=0;
              CASE D OF
                1:BEGIN                       (* ADVANCE DISPLAY NUMBER *)
                  NUMBER:=SUCC(NUMBER);
                  IF NUMBER>9 THEN NUMBER:=0;
                  BYTE[PORTB]:=NUMBER;
                  FOR SCRAP:=1 TO 15000 DO ;
                END; (*BEGIN*)
                2:BEGIN                             (* DIAL NUMBER *)
                  BYTE[PORTA]:=CURRENTPORTA+192;    (* GIVE OFF-HK *)
                  FOR SCRAP:=1 TO 30000 DO ;        (* WAIT FOR DIAL TONE *)
                  SCRAP:=PHONENUMBER+(12*NUMBER);   (* FIND START  *)
                  FOR G:=1 TO 12 DO BEGIN           (* READ 12 NUMBERS AND *)
                    E:=BYTE[SCRAP];
                    IF E<11 THEN BEGIN              (* DIAL ONLY IF NUMBER *)
                      IF E=10 THEN BYTE[PORTB]:=0   (* EQUALS 1 TO 10. IF  *)
                        ELSE BYTE[PORTB]:=E;        (* NUMBER=10, DISPLAY  *)
                      FOR F:=1 TO E DO BEGIN        (* A ZERO              *)
                        BYTE[PORTA]:=CURRENTPORTA;      (* ON HOOK *)
                        FOR H:=1 TO 1000 DO ;
                        BYTE[PORTA]:=CURRENTPORTA+64;   (* OFF HOOK *)
                        FOR H:=1 TO 1000 DO ;
                      END; (*FOR*)
                      FOR F:=1 TO 10-E DO FOR H:=1 TO 1000 DO ;
                      BYTE[PORTA]:=CURRENTPORTA+192;
                      FOR H:=1 TO 10000 DO ;
                    END; (*IF*)
                    SCRAP:=SUCC(SCRAP);
                  END; (*FOR*)
                  CURRENTPORTA:=CURRENTPORTA+64;    (* UPDATE PORTA FOR OFF-HK
*)
                  BYTE[PORTA]:=CURRENTPORTA+128;    (* DELETE THIS LINE IF TBL
*)
                  LASTDISPLAY:=8;                   (* SET DISPLAY TO 8 FOR
*)
                  BYTE[PORTB]:=LASTDISPLAY;         (* DISCONNECT (ON-HK)
*)
                  FOR SCRAP:=1 TO 15000 DO ;
                END (*WHILE*)
              END; (*CASE*)
            END; (*WHILE*)
            SCRAP:=0;
          END; (*BEGIN*)
          8:SCRAP:=64;                              (* OFF-HK OR ON-HK *)
          9:BEGIN
            CURRENTPORTA:=0;
            BYTE[PORTA]:=CURRENTPORTA;
            FOR SCRAP:=1 TO 8 DO LASTPORTA[SCRAP]:=FALSE;
          END (*BEGIN*)
        END; (*CASE*)
        IF (LASTDISPLAY<>7) AND (LASTDISPLAY<9) THEN BEGIN
          IF LASTPORTA[LASTDISPLAY]=FALSE THEN BEGIN
            CURRENTPORTA:=CURRENTPORTA+SCRAP;        (* CALCULATE NEW PORT *)
            BYTE[PORTA]:=CURRENTPORTA;               (* VALUE              *)
            LASTPORTA[LASTDISPLAY]:=TRUE;            (* SET FLAG           *)
          END (*IF*)
          ELSE BEGIN
            CURRENTPORTA:=CURRENTPORTA-SCRAP;        (* CALCULATE NEW PORT *)
            BYTE[PORTA]:=CURRENTPORTA;               (* VALUE              *)
            LASTPORTA[LASTDISPLAY]:=FALSE;           (* RESET FLAG         *)
          END; (*ELSE*)
        END; (*IF*)
        FOR SCRAP:=1 TO 3 DO BEGIN                   (* BLINK THE DISPLAY  *)
          BYTE[PORTA]:=CURRENTPORTA+128;             (* AFTER EXECUTING    *)
          FOR C:=1 TO 8000 DO ;                      (* COMMAND            *)
          BYTE[PORTA]:=CURRENTPORTA;
          FOR C:=1 TO 8000 DO ;
        END; (*FOR*)
        FOR SCRAP:=1 TO 15000 DO ;
      END (*BEGIN*)
    END; (*CASE*)
  END (*WHILE*)
END. (*BEGIN*)
```

ARK ROYAL GAMES

ARK ROYAL GAMES is drastically cutting prices and reducing our inventory on most of our CoCo products. Prices have been slashed on even our new programs. Send a SASE for complete price listing or $1.00 for catalog (refunded with first order).

Better hurry. When item is depleted it will not be restocked.

EXAMPLES

ACES (64K Disk) WWI Flight/Combat simulator	**$15**
DOUGHBOY (64K Disk) WWI Real Time Combat	**$14**
COMPANY COMMANDER (32K) Tactical War Game	**$15**
ALL MODULES FOR COMPANY COMMANDER	**$10**
COMPANY COMMANDER SCENARIO CREATOR (32K)	**$12**
OKINAWA (64K Disk) WWI Marine Invasion	**$12**
LUFTFLOTTE (32K) Battle of Britain	**$14**
FIRE ONE! (CoCo 3 Disk) Sub Warfare in WWII	**$15**
PRO FOOTBALL (CoCo 3) 1 or 2 players	**$12**
BATAAN (64K Disk] Two games in one	**$10**
TUNIS (32K) Battle in North Africa	**$ 8**
GUADALCANAL (32K) America Strikes Back	**$ 7**
BOMBER COMMAND (32K)	**$ 6**

And more! Almost all prices have been cut. Call or write for price list.

ARK ROYAL GAMES
Post Office Box 14806 • Jacksonville, FL 32238
(904) 221-5712

Include 50 cents per program shipping and handling.
Florida residents add 6% sales tax.

VIP TERMINAL

VIP Terminal

RATED BEST IN JANUARY 1984 "RAINBOW"

For your important communications needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs and messages and print them! The VIP Terminal features 32, 51, 64 or 85 characters by 21 or 24 lines on the screen and has a 43K byte buffer to store information. DISK $29.95

VIP Disk-ZAP 1.1

VIP DISK-ZAP

RAVED ABOUT IN THE APRIL 1983 "RAINBOW"

Now you can retrieve lost data on any disk. VIP Disk-Zap is the ultimate repair utility for repair of most disk errors. VIP Disk-Zap verifies diskettes, reads and writes any sector and lets you retrieve all types of bashed text files, BASIC and ML programs. VIP Disk-Zap includes an informative 50 page tutorial manual. New features of version 1.1 are FASTER and more RELIABLE disk access and printing at up to 9600 BAUD. DISK $24.95

VIP Disk-Zap owners: upgrade to VIP Disk-Zap 1.1 for $10 + $3 S/H. Send only ORIGINAL disk and $13 Total.

Do your assembly language programming on the wide screen

A Patch for a Patch

By Randall Reid

Are you tired of writing assembly language programs using the little 32-by-16 window while your 80-column screen sleeps in the background? Well, help has arrived. Roger Schrag freed us from our cassette players with *Super Patch* in September 1983 ("Superpatch for *EDTASTM+*," Page 66). Now using my program, *EDPatch*, we can move to the big screen and actually *see* our listings without listing each line.

My patch performs about the same as the patch for Disk *EDTASM+* found in Doctor ASCII's January '88 column (Page 154), with the same limitations. The main differences are a larger buffer in *Super Patched EDTASM+* and the additions Roger built in (i.e., key repeat and the ability to call a directory without exiting the program). One word of caution: My program will crash if you exceed the buffer. It will also crash if a disk error occurs. (In this case, however, the program can be restarted without losing your data.)

The buffer is between &H38FF and &H7FFF — a little over 16K. There is no end-of-buffer signal, so if you exceed the buffer while loading or editing, you will crash and lose your data permanently. The buffer will hold about 1000 lines of lightly commented code. That is equivalent to three times the code Roger used to write *Super Patch* (without his comments) and should be ample for most routines, but that monster arcade game won't fit. You can still write the code in 80-column format and save it in blocks to load in your original *Super Patched EDTASM*. My program automatically appends files, so you load them in the order you want them and renumber to reconstruct your monster.

I do not recommend in-memory assembly unless you want to alter your operating system or are very careful about where you assemble it. Assembling to disk works as usual and is a better idea. No matter what assembler you use, it's a good idea to use the W command frequently to make sure you have your file in case of crash.

If you do crash during disk I/O, type EXEC&H2D88 and press ENTER *twice*. This takes you to *ZBUG* with all files closed and your original buffers intact.

To patch *Super Patched EDTASM+*, initialize a disk. Once you have your disk ready, copy *Super Patched EDTASM+* to the disk and rename it ED+/BIN. Once you have done this, copy EDPATCH and EDLOADER to the disk. Now cold start your CoCo 3 and enter RUN EDPATCH. When EDPATCH returns an OK prompt, cold start your computer again. Now enter `LOADM"SUPERED",&H1000`. When SUPERED has loaded, enter the following:

```
SAVEM"SUPERED1",&H1E00,&H47FF,&H1E00
```

You are now ready to run EDLOADER and explore assembly language programming on an 80-column screen. Please note: EDLOADER offset loads *SuperED1* to &HE00, which may make my final two instructions seem a little ridiculous. However, CoCo 3 will not let the program load directly to &HE00. The stack or buffers overwrite some code. *SuperED1* can be loaded and executed at &H1E00, but you will lose 1K from the buffer. Those final instructions must be entered directly from the keyboard and cannot be included in a program line.

You can rename SUPERED1 to something easier to type. (I call mine ED.) However, you must also edit EDLOADER to accept the new filename.

So what are you waiting for? Wake up your 80-column screen and start programming.

Editors Note: For your convenience the assembled *Super Patch* routine from the September 1983 issue is included on this month's RAINBOW ON DISK. You will need to refer to the September '83 issue for instructions on running *Super Patch.*

(Questions and comments about these programs may be directed to the author at R.R. 4, Wiarton, ON, Canada N0H 2T0. Please include an SASE when requesting a reply.) ☐

Randall Reid is a self-employed commercial artist and an electronics technician. He has several CoCos including a CoCo 2 that runs his heating system and records weather information.

Listing 1: `EDPATCH`

```
0 WIDTH32:PCLEAR8:GOTO10
5 SAVE"EDPATCH3":END
10 PRINT"LOADING":LOADM"ED+"
20 CLS:PRINT"PATCHING"
30 FORX=&HE00 TO &H37FF
40 PRINT@25,HEX$(X)
50 IF PEEK(X)<>&H7F THEN 110
60 IF PEEK(X+1)<>&HFF THEN 110
70 IF PEEK(X+2)=&HDF OR PEEK(X+2
)=&HDE THEN 90 ELSE 110
80 GOTO 110
90 PRINTHEX$(X)
100 FORY=0TO2:POKEX+Y,&H12:NEXTY
110 NEXTX
120 SAVEM"SUPERED",&HE00,&H37FF,
&HE00
130 PRINT:PRINT"YOU MUST NOW COL
DSTART AND TYPE LOADM";CHR$(34);
"SUPERED";CHR$(34);",&H1000"
140 PRINT:PRINT"WHEN SUPERED HAS
 LOADED TYPE SAVEM";CHR$(34);"SU
PERED1";CHR$(34);",&H1E00,&H47FF
,&H1E00"
150 END
```

Listing 2: `EDLOADER`

```
0 PCLEAR8:WIDTH32:GOTO10
1 '*****COPYRIGHT 1988 RANDALL R
EID
5 SAVE"EDLOADER":END
10 FORA=0TO5:READ A$:POKE VAL("&
H"+A$),&HC0:NEXT
20 POKE&HF66B,&HC7:POKE&HF688,&H
CF:POKE&HF866,&HC7:POKE&HF875,&H
CE
30 POKE&HE0C0,6:POKE&HE0C8,6:POK
E&HE0C6,&H3E
40 WIDTH80:CLS5:PRINT"LOADING SU
PERPATCHED EDTASM+ PROGRAM"
50 PRINT:PRINT"IF YOU CRASH OUT
OF THE PROGRAM DURING DISK I/O T
RY TYPING EXEC&H2D88 AND YOU   M
AY GET THE PROGRAM BACK WITH BUF
FERS INTACT":PRINT
60 LOADM"SUPERED1",&HE00-&H1E00+
65536:EXEC
70 DATA F68D,F6A3,F6D5,F7BC,F857
,F90D
```

FILE TRANSFER UTILITIES

XXX: Reviews - December Rainbow   Dale Puckett - November Rainbow. XXX

The GCS File Transfer Utilities provide a simple and quick method to transfer text and binary files from and to a variety of floppy disk formats.

Need to transfer files to and from PC (MSDOS), RSDOS, FLEX and MINI-FLEX disks on your OS-9 system? Have text files on a PC (MSDOS) system at work and want to work on them at home? Have source programs (BASIC, C, Pascal, etc.) which you wish to port to another system?

With GCS File Transfer Utilities, just place the PC (MSDOS), RSDOS, FLEX or MINI-FLEX disk into you disk drive - enter a simple command and the file is copied into a OS-9 file. File transfer back is just as simple. With Multi-Vue version, just select command from one of three menus.

PCDIR	directory of PC disk	RSDIR	directory of RSDOS disk
PCDUMP	display PC disk sector	RSDUMP	display RSDOS disk sector
PCREAD	read file from PC disk	RSREAD	read file from RSDOS disk
PCWRITE	write file to PC disk	RSWRITE	write file to RSDOS disk
PCRENAME	rename PC file	FLEXDIR	directory of FLEX disk
PCDELETE	delete PC file	FLEXDUMP	display FLEX disk sector
PCFORMAT	format PC disk	FLEXREAD	read FLEX file
		FLEXWRITE	write file to FLEX disk

Extensive options Single, double sided disks. Single, double density disks. 35, 40 or 80 track floppy drives. 8 or 9 sectors (PC). First level subdirectories (PC). Binary files. Use pipes for direct and multiple transfers.

Requires OS-9. 2 drives (one can be hard or ramdisk). Multi-Vue for Multi-Vue version. SDISK (SDISK3 for COCO III).

GCS File Transfer Utilities for CoCo - Multi-Vue version $54.95
- Standard version $44.95

SDISK or SDISK 3 $29.95

Standard diskettes are OS-9 format (5.25") - add $2.50 for 3.5". Orders must be prepaid or COD. VISA/MC accepted. Add $1.75 S&H, COD is additional.

GRANITE COMPUTER SYSTEMS
Route 2 Box 445 Hillsboro, N.H. 03244
(603) 464-3850

OS-9 is a trademark of Microware Systems Corporation and Motorola Inc.
MS-DOS is a trademark of Microsoft Corp. FLEX is a trademark of TSC, Inc.

VIP Calc 1.1

"MORE USEABLE FEATURES"
FEBRUARY 1985 "RAINBOW"

VIP CALC

VIP Calc has all the features of VIP Calc III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Calc is the most complete calc for the CoCo 1 & 2! Version 1.1 has FASTER and more RELIABLE disk access and vastly improved display speed. DISK $59.95

VIP Calc owners: upgrade to VIP Calc 1.1 for $10 + $3 S/H. Send only ORIGINAL disk and $13 total.

VIP Speller 1.1

INCLUDES 50,000 WORD DICTIONARY

VIP SPELLER

VIP Speller works with ANY ASCII file created by most popular word processors - even Telewriter 64. It automatically checks text files for words to be corrected, marked for special attention or even added to the 50,000 word Dictionary. You can even view the word in context. Words can be added to or deleted from the dictionary or you can create your own dictionary! New features of version 1.1 are FASTER and more RELIABLE disk access and printing at 9600 BAUD. DISK $34.95

VIP Speller owners: upgrade to VIP Speller 1.1 for $10 + $3 S/H. Send only ORIGINAL disk and $13 Total.

A program designed to teach fundamental math skills to new students

Count on CoCo

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Several months ago, I ventured into the world of early childhood education with a series of programs — *Opposites Concepts 1* (August '88, Page 92), *Opposite Concepts 2* (October '88, Page 90) and *Match Game of Opposites* (September '88, Page 92). Judging from my mail and the comments from those who have used them, my programs seem to be meeting a need in an area where there is little software.

Because of this need, I have written another educational program, *Count on Me*, designed for use by young and special-needs students. It allows hands-on counting experience and tests these skills in a manner even the youngest Color Computer user can handle.

Why Counting?

There is little educational software dealing with even the most basic childhood skills. Our school has an early-childhood program, which deals with special-needs students as young as two years old. We have difficulty finding any software for these young children.

Parental pressure has resulted in a computer being placed in this classroom (not a Color Computer — that *other* kind), and there's almost no software for the darn thing. What can a two-year-old do on a computer without appropriate software? To be honest, almost nothing of value. Still, some parents think that the computer is the only solution, so the thing sits there, collecting dust.

Since some of you have been kind enough to donate your old CoCo 1s and 2s to our school system, I will be adding one of these CoCos to our preschool class. For it to be useful though, I need some software to use with this CoCo. That's how *Count on Me* came about.

Count on Me uses only the spacebar and the ENTER key for student response. Most small children can use these keys without too much trouble. Although this may be too much for some of our youngest children, the program can be quite useful when dealing with older special-needs students.

Another nice feature about the program is that young students can use their fingers to count the large objects on the screen. This physical contact in the counting process helps to reinforce the number being taught. Naturally, this is not a program in which you would leave a young child alone at the computer. The program does require an adult to guide the child throughout the process.

Using the Program

When you run *Count on Me*, you will see a standard title card. Press ENTER and the following menu will appear:

```
A) REVIEW NUMBERS
B) QUIZ GRAPHICS
C) QUIZ NUMBERS

<<<SELECT YOUR CHOICE>>>
```

The program operates exactly like the *Opposites* series. Press A to review the numbers. The number is shown as an Arabic numeral and in its written form next to the item or items corresponding to that number. Pressing ENTER advances the program to the next item.

To test the child on the numbers, press B. An inverted screen will show the number written in white on black. The child may advance the flashing cursor to the picture matching the number by pressing the spacebar. The child presses ENTER when the cursor is on the right choice. The ENTER key is then used to advance to the next screen.

You may press @ at any time to check the score and then press C to continue the program from the scorecard. If you press C at the main menu, you will be tested on matching Arabic numbers with the number in written form. Again, this quiz works like my other programs. Press the letter (A,B or C) corresponding to the correct choice, press @ to check your progress and ENTER to proceed to the next question.

Since there are only ten numbers introduced, the quiz is rather short. However, this fits the attention span of young and many special-needs students. In addition, the program is useful as an introduction to computers for any child. You be the judge, and let me know how useful you think it is.

Conclusion

I don't need to say much about *Count on Me*. Like any program meant to help teach fundamental skills to students with limited abilities, the instructions are simple. I would appreciate any suggestions you can give for other program ideas that could fit into this same genre.

Also, let me again thank all those kind folks who have sent in used Color Computer 1s and 2s for our special-needs students. Every one has found a home in a classroom, which has made our Resource Rooms the envy of other schools.

See you next month. □

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

45	205
95	38
170	15
260	109
340	159
405	229
460	54
505	138
560	222
595	26
630	125
760	250
END	15

The listing: COUNTME

```
1 REM****************************
2 REM*       COUNT ON ME         *
3 REM*    COPYRIGHT (C) 1988     *
4 REM*     BY FRED B. SCERBO     *
5 REM*     60 HARDING AVENUE     *
6 REM*  NORTH ADAMS, MA 01247    *
7 REM****************************
10 CLEAR3000
15 CLS0:PRINTSTRING$(32,188);STR
ING$(32,156);:FORI=1TO160:READA:
PRINTCHR$(A+128);:NEXT
20 PRINTSTRING$(32,195);STRING$(
32,179);
25 PRINT@358," AN INTRODUCTION T
O ";:PRINT@390,"  COUNTING NUMBE
RS  ";
30 PRINT@422,"  BY FRED B.SCERBO
 ";:PRINT@454," COPYRIGHT (C) 1
988 ";
35 DATA126,124,125,117,124,124,1
22,122,,117,117,114,,122,126,125
,124,122,94,92,93,85,82,,90,30,2
9,28,26,30,28,28
40 DATA122,,116,117,,,122,122,,1
17,117,125,114,122,120,117,,120,
90,,85,85,93,82,90,26,21,,26,26,
16,
45 DATA122,,,117,,,122,122,,117,
117,,125,122,,117,,,90,,85,85,,9
3,90,26,21,,26,30,28,
50 DATA122,,117,117,,,122,122,,1
17,117,,,122,,117,,,90,,85,85,,,
90,26,,,26,26,16,
55 DATA124,124,124,116,124,124,1
20,124,124,124,116,,,120,,124,12
0,,92,92,92,84,,,88,24,,,24,28,2
8,28
60 X$=INKEY$:IFX$<>CHR$(13)THEN6
0
65 DIM P$(10,3),A$(6),B$(20),C$(
20),A(20),N(20),B(4),C(4),D(4),E
(4),F(4),AO(20)
70 FORI=1TO3:READ C(I),D(I),E(I)
,F(I):NEXT:FORI=1TO6:READA$(I):N
EXT:FORI=1TO10:READP$(I,1),B$(I)
,P$(I,2),P$(I,3),C$(I):NEXT
75 COLOR1,0
80 CLS:PRINTSTRING$(32,"=");:PRI
NT@74,"COUNT ON ME ":PRINT@134,"
```

Alpha Software Technologies

OS9 Level II BBS Release 2.0

The best BBS system has just gotten better! System comes complete and ready to run in less than 5 minutes! Use the built in menus or create your own, you can even run your own programs or games on-line! Complete message system allows easy message posting and retrieving. Complete file transfer system supports Xmodem and Ymodem as well as keyword searching single line and paragraph file descriptions. System runs completely in the background, allowing you full use of your computer! Also comes with it's own Terminal program "Quikterm" Free!
512k OS9 Level II and RS-232 Pak Required........$29.95

The Zapper

This wonderful utility allows you to patch anything! Patch commands directly on the disk and fix CRCs automatically! Even allows you to patch the OS9boot file without making a new boot disk! Save files that have been lost or deleted! Fix crashed disks! Hundreds of uses!
64k OS9 Level I or II required........$19.95

Disk Manager Tree

This versatile utility will make your OS9 life a breeze! No more will you have to fight with complicated directory structures. No more searching for files and typing long path names. All of this is displayed using windows. A tree window allows you to change, create, and delete directories quickly. A files window allows you to copy, view and delete files easily. Perfect for the OS9 beginner! Multi-Vue compatibility makes it perfect for Multi-Vue users!
512k OS9 Level II Required........$29.95

Level II Tools

Finally OS9 life becomes easy! With these great utilities you'll be using OS9 like a pro! Complete wildcard commands make file manipulation simple and easy! Tree commands make directory manipulation a breeze! Windowing utilities make changing colors and creating and maintaining windows a snap! Many other useful utilitiies make your OS9 life more pleasant! 25 great utilities for only $24.95, thats less than $1.00 per utility!
128k OS9 Level II Required........$24.95

Warp One

Finally a complete OS9 Level II windowing terminal that you can afford! The program's many features include Auto-dial, Auto-macro, File transfers, buffer capture, on-line timer, chat-mode and much, much more! Menu and dialog windows make it super simple to use! All you'll ever need in a terminal program! Comes complete with ICON for Multi-Vue compatibility.
512k OS9 Level II and RS-232 Pak Required........$34.95

Multi-Menu

Easily create your own pop-down menus with this great utility! No programming experience neccessary! With this utility you can run any OS9 command or program from a menu. Menu creation is super-simple and super easy! Actually see the menu as it develops. A must for any Multi-Vue user!
512k OS9 Level II and Multi-Vue required........$19.95

Send check or money order to: Alpha Software Technologies
P.O. Box 16522
Hattiesburg MS. 39402
Or call: (601) 266-2773

RAINBOW CERTIFICATION SEAL

Please add $3.00 Shipping and handling C.O.D. Orders add an additional $2.00

VIP Database 1.1

VIP DATABASE

"ONE OF THE BEST" JUL '84 "RAINBOW"

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Database is the most complete database for the CoCo 1 & 2! Version 1.1 has FASTER and more RELIABLE disk access and single spaced reports. **DISK $49.95**

VIP Database owners: upgrade to VIP Database 1.1 for $10 + $3 S/H. Send original disk and $13 total.

VIP Writer 1.1

VIP WRITER

RATED "BEST" IN SEPT '88 "RAINBOW"

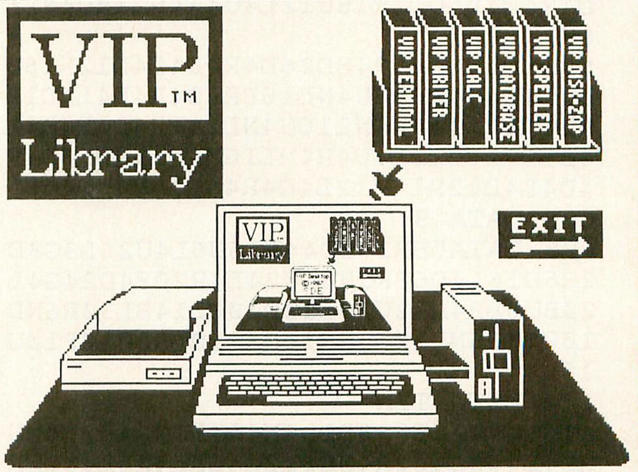
VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green & white, double clock speed is not supported, Spooler and menus are unavailable because of memory limitations. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! Version 1.1 includes the configuration/ printer installation program and RGB Hard Disk support. Available thru Radio Shack Express Order #90-141.

Includes VIP Speller 1.1 DISK $69.95

VIP Writer owners: upgrade to VIP Writer 1.1 for $20 + $3 S/H. Send only ORIGINAL disk and $23 total.

```
A) REVIEW NUMBERS":PRINT@198,"B)
 QUIZ GRAPHICS":PRINT@262,"C) QU
IZ NUMBERS"
85 PRINT@324,"<<<SELECT YOUR CHO
ICE>>>"
90 PRINT:PRINTSTRING$(32,"=");:P
RINT@420,"DEDICATED TO THE STUDE
NTS":PRINTTAB(6)"OF CONTE MIDDLE
 SCHOOL"
95 X$=INKEY$:X=RND(-TIMER):IFX$=
"A"THEN350ELSEIFX$="B"THEN100ELS
EIFX$="C"THEN630ELSE95
100 CLS0:PMODE0,1:PCLS1
105 LINE(0,0)-(254,170),PRESET,B
110 LINE(6,4)-(122,82),PRESET,BF
115 LINE(128,4)-(248,82),PRESET,
B
120 LINE(6,86)-(122,164),PRESET,
B
125 LINE(128,86)-(248,164),PRESE
T,B
130 DRAW"BM26,188C0NU10R10NU10BR
6R10U6L10U4R10BR6NR10D4NR10D6R10
BR12BU6NE4D2F4BR6R10U6L10U4R10BR
6ND10R10D4NL10BR6NR10D6U10R10D10
BR6NR10U10R10BR6NR10D4NR10D6R10B
R10U10NL4R10D4NL10D6NL14BR6U10R1
0D4NL10D6BR6U10R10D4L10R4F6BR6E4
U2H4"
135 DATA130,6,246,80,6,86,120,16
2,130,86,246,162
140 PAINT(2,2),0,0:PCOPY1TO3
145 PMODE0,4:PCLS1
150 LINE(0,0)-(254,170),PRESET,B
F
155 LINE(8,6)-(120,80),PSET,BF
160 PCOPY4TO2:PMODE0,1:SCREEN1,1
165 DATA"BM2,8C1","BM130,8C0","B
M2,90C0","BM130,90C0","BM2,48C0"
,"BM130,48C0"
170 FORI=1TO10
175 A(I)=RND(10):IFN(A(I))=1THEN
175
180 N(A(I))=1:NEXTI:FORY=1TO20:C
OLOR1,0
185 FORI=2TO4
190 B(I)=RND(3)+1:IFN(B(I))=0THE
N190
195 N(B(I))=0:NEXTI:FORI=1TO4:N(
I)=1:NEXT
200 B=RND(10):IFB=A((Y))THEN200
205 C=RND(10):IFC=B OR C=A((Y))T
HEN205
210 DRAW A$(1):DRAWP$(A(Y),1)
215 DRAW A$(B(2)):DRAWP$(B,2):DR
AWP$(B,3)
220 DRAW A$(B(3)):DRAWP$(C,2):DR
AWP$(C,3)
225 DRAW A$(B(4)):DRAWP$(A(Y),2)
:DRAWP$(A(Y),3)
230 COLOR1,0
235 Z=0
240 PMODE0,4
245 DRAW A$(1)+"C0":DRAWP$(A(Y),
1)
250 DRAW A$(B(2))+"C1":DRAWP$(B,
2):DRAWP$(B,3)
255 DRAW A$(B(3))+"C1":DRAWP$(C,
2):DRAWP$(C,3)
260 DRAW A$(B(4))+"C1":DRAWP$(A(
Y),2):DRAWP$(A(Y),3)
265 PMODE0,1:SCREEN1,1
270 LINE(8,6)-(120,80),PSET,B
275 X$=INKEY$:IFX$=" "THEN285ELS
EIFX$="@"THEN800
280 COLOR1,0:LINE(8,6)-(120,80),
PRESET,B:GOTO270
285 Z=Z+1:IFZ=4THENZ=1
290 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PSET,B
295 X$=INKEY$:IFX$=" "THEN285ELS
EIFX$=CHR$(13)THEN305ELSEIFX$="@
"THEN800
300 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PRESET,B:GOTO290
305 IFZ+1=B(4)THEN315
310 NW=NW+1:FORK=1TO5:PMODE0,4:S
CREEN1,1:SOUND10,3:PMODE0,1:SCRE
EN1,1:SOUND1,3:NEXTK:GOTO290
315 NC=NC+1:PMODE0,4:PCLS1:LINE(
0,40)-(256,126),PRESET,B:LINE(6,
44)-(124,122),PRESET,B:LINE(130,
44)-(248,122),PRESET,B:PAINT(2,4
2),0,0
320 DRAW A$(5):DRAWP$(A(Y),1)
325 DRAW A$(6):DRAWP$(A(Y),2):DR
AWP$(A(Y),3)
330 SCREEN1,1
335 X$=INKEY$:IFX$<>CHR$(13)THEN
335
340 PMODE0,1
345 PCOPY3TO1:SCREEN1,1:PCOPY2TO
4:NEXTY:GOTO800
350 PMODE0,2:PCLS1:SCREEN1,1:LIN
E(0,40)-(256,126),PRESET,B:LINE(
6,44)-(124,122),PRESET,B:LINE(13
0,44)-(248,122),PRESET,B:PAINT(2
,42),0,0
355 FORI=1TO10:DRAW A$(5):DRAWP$
(I,1)
360 DRAW A$(6):DRAWP$(I,2):DRAWP
$(I,3)
365 X$=INKEY$:IFX$<>CHR$(13)THEN
365
370 COLOR1,0:LINE(8,46)-(122,120
),PSET,BF:LINE(132,46)-(246,120)
,PSET,BF:NEXTI
375 RUN
380 DATA"BR56BD44R16U6L4U26L8G8D
2R6D16L4D6BD10BL10D10R10U10NL10B
R6ND10F10NU10BR6NR6U6NR6U4R6"
385 DATA ONE
```

```
390 DATA"BR58BD48R8E4U12R4U6L4U6
H4L16G4D6L4D6R4D12F4R8BU8NE4NH4B
U8NLNR2BU6BL4NR2BR6R2"
395 DATA BR
400 DATA 1
405 DATA"BR48BD44R28U12L6D4L14U4
E4R10E4U8H4L18G4D4R6E2R8F2D2L10G
8D12BD12BL6NL6NR6D10BR12NU10R6NU
10R6U10BR6R10D10L10U10"
410 DATA TWO
415 DATA"BR36BD48R8E4U12R4U6L4U6
H4L16G4D6L4D6R4D12F4R8BU8NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BR38BD22R8E
4U12R4U6L4U6H4L16G4D6L4D6R4D12F4
R8BU8NE4NH4BU8NLNR2BU6BL4NR2BR6R
2"
420 DATA BR
425 DATA 2
430 DATA"BR70BD28E4U8H4L18G4D4R6
E2R8F2D4L10G4F4R10D4G2L8H2L6D4F4
R18E4U8H2BL48BD24R6ND10R6BR6D10U
6R10U4D10BR6U10R10D4L10R4F6BR6NR
10U6NR10U4R10BR6NR10D4NR10D6R10"
435 DATA THREE
440 DATA"BR24BD48R6E4U12R4U6L4U6
H4L12G4D6L4D6R4D12F4R6BU8NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BR32BD22R6E
4U12R4U6L4U6H4L12G4D6L4D6R4D12F4
R6BU8NE4NH4BU8NLNR2BU6BL4NR2BR6R
2BR32BD22R6E4U12R4U6L4U6H4L12G4D
6L4D6R4D12F4R6BU8NE4NH4BU8NLNR2B
U6BL4NR2BR6R2"
445 DATA BR
450 DATA 3
455 DATA"BR74BD28NR8U14L8D14L10U
14L8D22R18D8R8U8R8U8BD24BL48NR10
D4NR10D6BR16U10R10D10NL10BR6NU10
R10NU10BR6U10R10D4L10R4F6"
460 DATA FOUR
465 DATA"BR48BD34BU4NG2U2H2L2G2D
2NF2L14NG2U2H2L2G2D2NF2L10U20R28
D6R6D6R8D8L4BR50BD4BU4NG2U2H2L2G
2D2NF2L14NG2U2H2L2G2D2NF2L10U20R
28D6R6D6R8D8L4BD32BL54NG2U2H2L2G
2D2NF2L14NG2U2H2L2G2D2NF2L10U20R
28D6R6D6R8D8L4"
470 DATA"BR50BD4BU4NG2U2H2L2G2D2
NF2L14NG2U2H2L2G2D2NF2L10U20R28D
6R6D6R8D8L4"
475 DATA 4
480 DATA"BR46BD14R30D8L22D6R18F4
D8G4L24H2U4R20U4L20U18BD36BL12NR
10D4NR10D6BR16NU10BR12H4U6BR8D6G
4BR12NR10U6NR10U4R10"
485 DATA FIVE
490 DATA"BR32BD28U6L10E6L4E6L4E8
F8L4F6L4F6L10D6L2BR46U6L10E6L4E6
L4E8F8L4F6L4F6L10D6L2BL26BD20U6L
10E6L4E6L4E8F8L4F6L4F6L10D6L2BD2
0BL26U6L10E6L4E6L4E8F8L4F6L4F6L1
0D6L2BR46U6L10E6L4E6L4E8F8L4F6L4
F6L10D6L2"
495 DATA BR
500 DATA 5
505 DATA"BR46BD14R30D8L22D6R18F4
D8G4L24H2NU26BE4BR4R14U4L14D4BD1
4BL12NR10D4R10D6NL10BR8NU10BR8E6
NH4NE4F6"
510 DATA SIX
515 DATA"BR10BD26R102L18E10M-8,+
4L6U4H2L2G4R4D4F4L26E10M-8,+4L6U
4H2L2G4R4D4F4L26E10M-8,+4L6U4H2L
2G4R4D4F4BD26BL20R102L18E10M-8,+
4L6U4H2L2G4R4D4F4L26E10M-8,+4L6U
4H2L2G4R4D4F4L26E10M-8,+4L6U4H2L
2G4R4D4F4"
520 DATA BR
525 DATA 6
530 DATA"BR46BD14R30D8M-12,+22L1
2M+12,-22L20U8BD38BL8L10D4R10D6N
L10BR6NR10U6NR10U4R10BR6D6F4E4U6
BR6NR10D4NR10D6R10BR6U10F10U10"
535 DATA SEVEN
540 DATA"BR34BD10D10R12U6L4D6R12
U10NF2H10G12E2NR20BR30D10R12U6L4
D6R12U10NF2H10G12E2NR20BL46BD24D
10R12U6L4D6R12U10NF2H10G12E2NR20
BR30D10R12U6L4D6R12U10NF2H10G12E
2NR20BR30D10R12U6L4D6R12U10NF2H1
0G12E2NR20"
```



The VIP Integrated Library 1.2 combines all six popular VIP programs - Writer 1.1, Speller 1.1, Calc 1.1, Database1.1, Terminal and Disk-Zap 1.1 - into one program on one disk. The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mailmerge, spreadsheet financial analysis, telecommunications and disk maintenance. Just move the hand to the volume on the bookshelf and the application is there. 64K req'd. $149.95 + $4 S/H US, $5 Canada, $10 Foreign.VIP Library is available thru Radio Shack Express Order #90-213.

VIP Integrated Library owners: upgrade to the VIP Integrated Library 1.2 for $45 + $3 S/H. Send only ORIGINAL disk and $48 Total.

SD ENTERPRISES

(503) 663-2865 P. O. BOX 1233. Gresham, OR. 97030
Non VIP Library orders add $3 for shipping in USA, Canada $4, Foreign $6. COD orders add an additional $2.25. Personal checks allow 3 weeks for delivery. All other orders shipped the same day.

```
545 DATA "BL46BD24D10R12U6L4D6R1
2U10NF2H10G12E2NR20BR30D10R12U6L
4D6R12U10NF2H10G12E2NR20"
550 DATA 7
555 DATA"BR50BD14R26F4D6G4F4D8G4
L26H4U8E4H4U6E4BD4BR4R18D6L18U6B
D14R18D6L18U6BD20BL24NR10D4NR10D
6R10BR6U10BR6NR10D10R10U6NL6BR6N
U4ND6R10D6U10BR6R6ND10R6"
560 DATA EIGHT
565 DATA"BR12BD10D6G2D6R6U4F4R10
H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R1
0H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R
10H2U2H2L4H2U6L6BR24D6G2D6R6U4F4
R10H2U2H2L4H2U6L6BL90BD20"
570 DATA"BR12BD10D6G2D6R6U4F4R10
H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R1
0H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R
10H2U2H2L4H2U6L6BR24D6G2D6R6U4F4
R10H2U2H2L4H2U6L6"
575 DATA 8
580 DATA"BR50BD14R26F4D22G4L26H4
U2R26U8L22H4U8E2BD4BR6R18D4L18U4
BD32BL14ND10F10U10BR6D10BR6U10F1
0U10BR6NR10D4NR10D6R10"
585 DATA NINE
590 DATA"BR8BD10D4R4D4L4D12R16U1
2L4U4R4NL16U4NL16BR6D4R4D4L4D12R
16U12L4U4R4NL16U4NL16BR6D4R4D4L4
D12R16U12L4U4R4NL16U4NL16BR6D4R4
D4L4D12R16U12L4U4R4NL16U4NL16BR6
D4R4D4L4D12R16U12L4U4R4NL16U4NL1
6"
595 DATA"BL94BD26D4R4D4L4D12R16U
12L4U4R4NL16U4NL16BR6D4R4D4L4D12
R16U12L4U4R4NL16U4NL16BR6D4R4D4L
4D12R16U12L4U4R4NL16U4NL16BR6D4R
4D4L4D12R16U12L4U4R4NL16U4NL16"
600 DATA 9
605 DATA"BR36BD44R16U6L4U26L8G8D
2R6D16L4D6BR30H4U24E4R20F4D24G4L
20BU6BR4R12U20L12D20BD14BL30R6ND
10R6BR6NR10D4NR10D6R10BR6U10F10U
10"
610 DATA TEN
615 DATA"BR38BD16H4L4U2NR4D2L4NU
ND4L4U2L4D2R4NH6L2G4BR54H4L4U2NR
4D2L4NUND4L4U2L4D2R4NH6L2G4BR54H
4L4U2NR4D2L4NUND4L4U2L4D2R4NH6L2
G4BL42BD16H4L4U2NR4D2L4NUND4L4U2
L4D2R4NH6L2G4BR54H4L4U2NR4D2L4NU
ND4L4U2L4D2R4NH6L2G4BR54"
620 DATA"H4L4U2NR4D2L4NUND4L4U2L
4D2R4NH6L2G4BL42BD16H4L4U2NR4D2L
4NUND4L4U2L4D2R4NH6L2G4BR54H4L4U
2NR4D2L4NUND4L4U2L4D2R4NH6L2G4BR
54H4L4U2NR4D2L4NUND4L4U2L4D2R4NH
6L2G4BL10BD16H4L4U2NR4D2L4NUND4L
4U2L4D2R4NH6L2G4"
625 DATA 10
630 CLS:V=1
635 FORI=1TO10
640 AO(I)=RND(10)
645 IF N(AO(I))=1 THEN 640
650 N(AO(I))=1:NEXTI
655 FOR P=1TO10
660 CLS
665 PRINT@68,"WHICH WRITTEN NUMB
ER IS"
670 PRINT@132,C$(AO(P))+" ?"
675 FOR Q=1TO2
680 C(Q)=RND(10):IF C(Q)=AO(P) T
HEN680
685 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN680
690 NEXTK
695 NEXTQ:C(3)=AO(P)
700 FOR E=1TO3
705 F(E)=RND(3)
710 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN705
715 NEXTK:NEXTE
720 PRINT
725 PRINTTAB(8)"A-"+B$(C(F(1))):
PRINT
730 PRINTTAB(8)"B-"+B$(C(F(2))):
PRINT
735 PRINTTAB(8)"C-"+B$(C(F(3))):
PRINT
740 G$=INKEY$:IFG$="@"THEN800
745 IF G$=""THEN740
750 G=ASC(G$)-64
755 IF G<1 THEN 740
760 IF G>5 THEN 740
765 IF C(F(G))<>AO(P) THEN780
770 PRINT:PRINT"  RIGHT! THE ANS
WER IS: "+B$(AO(P))
775 NC=NC+1:GOTO790
780 PRINT:PRINT"   SORRY! THE AN
SWER IS: "+B$(AO(P))
785 NW=NW+1
790 X$=INKEY$:IFX$<>CHR$(13)THEN
790
795 NEXT P
800 CLS:PRINT@101,"YOU TRIED"NC+
NW"TIMES &":PRINT@165,"ANSWERED"
NC"CORRECTLY"
805 PRINT@229,"WHILE DOING"NW"WR
ONG."
810 NQ=NC+NW:IF NQ=0THEN NQ=1
815 MS=INT(NC/NQ*100)
820 PRINT@293,"YOUR SCORE IS"MS"
%."
825 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
830 X$=INKEY$:IFX$="Y"THEN RUN
835 IFX$="N"THENCLS:END
840 IFX$="C"THEN850
845 GOTO830
850 IFV=1THEN660
855 IFV=0THEN265
```

NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Home Help

Keeping Your Balance

CoCo 3

By Jerry Yates

At a recent club meeting, a new member asked me if I knew of a program to help him see if he had made a mistake in balancing his checkbook. I remembered a program I had written several years ago that could be of help, *Checkbook Checker.*

Checkbook Checker is very simple to use, and it even has instructions printed on the title screen. On booting the program and pressing a key to clear the intro, you are prompted for a beginning balance. Then you are asked for the check number and the amount in the format of *Check #,Amount* (the two are separated by a comma — e.g., *1001,250* would indicate that Check No. 1001 was written for the amount of $250). Enter deposits or checks paid to you as "negative payments:" *2000,-500* would indicate that you received $500. Along with the last 12 transaction records, the screen displays the current balance.

The Listing: CHEKBOOK

```
0 POKE65497,0:RGB
10 CLS0:GOSUB 180:PRINT@69,CHR$(
142);STRING$(20,140);CHR$(141);
20 PRINT@101,CHR$(138);" CHECKBO
OK  CHECKER ";CHR$(133);
30 PRINT@133,CHR$(138);"   BY JE
RRY YATES    ";CHR$(133);
40 PRINT@165,CHR$(138);"  AUGUST
 20,  1988   ";CHR$(133);
50 PRINT@197,CHR$(138)+STRING$(2
0,134)+CHR$(133);
60 PRINT@229,CHR$(138)" TO ENTER
 A DEPOSIT ";CHR$(133);
70 PRINT@261,CHR$(138);"USE NEGA
TIVE (-) NO.";CHR$(133);
80 PRINT@293,CHR$(138);" -500.00
 ENTER CK.# ";CHR$(133);
85 PRINT@325,CHR$(138);"    99999
9 TO EXIT    ";CHR$(133);
90 PRINT@357,CHR$(139);STRING$(2
0,131);CHR$(135);
95 FOR T=1TO5:GOSUB180:NEXT
96 PALETTE 12,63:PALETTE 13,0
100 FOR C=1TO3:SOUNDRND(200),2:N
EXT:PRINT@421,"";:INPUT"BEGINNIN
G BALLANCE";BAL:CLS
110 PRINT@0,USING" CURRENT BALLA
NCE =$$#####.##";BAL
120 PRINTSTRING$(32,131);
130 PRINT@448,STRING$(32,140);
140 INPUT" CHECK #, AMOUNT";CN,C
K
150 IF CN=999999 THEN GOTO 230 E
LSE BAL=BAL-CK
160 PRINT@416,USING"##### $$####
.## =$$####.##";CN;CK;BAL
170 GOTO 110
180 FOR X=1TO62:SET(X,Y,RND(9-1)
):NEXT
190 FOR Y=1TO30:SET(X,Y,RND(9-1)
):NEXT
200 FOR X=63TO1STEP-1:SET(X,Y,RN
D(9-1)):NEXT
205 FOR Y=30TO1STEP-1:SET(X,Y,RN
D(9-1)):NEXT
210 RETURN
230 CLS0:PRINT"I HOPE CHECKBOOK
CHECKER HAS     BEEN HELPFUL.":E
ND
```

Applying Labels

4K

By Ana M. Rodriguez

If you don't have the time to type up multiple address labels on the typewriter, and if you have a DMP-105 printer, this short program is for you. Just type it in and run, supplying the appropriate information when prompted (name, address, city, state and ZIP code). The program next will ask how many labels you want printed; make sure your printer is online with labels at the ready. If address labels aren't the kind of labels you need, you can modify the program in lines 50, 60 and 70.

The Listing: ADLABELS

```
10 REM **       LABELS        **
20 REM **         BY          **
30 REM **  ANA M. RODRIGUEZ   **
40 CLS:PRINTTAB(13);"LABELS"
50 PRINT"ENTER NAME":INPUT N$
60 PRINT"ENTER NUMBER & STREET":
INPUT S$
70 PRINT"ENTER CITY, STATE & ZIP
 CODE":INPUT C$
80 CLS:PRINT "REMEMBER: TURN ON
YOUR PRINTER"
90 INPUT "HOW MANY LABELS";L
100 REM PRINT LABELS
110 FOR A=1TOL
115 PRINT#-2,CHR$(27);CHR$(19)
120 PRINT#-2,TAB(3);N$:PRINT#-2,
TAB(3);S$:PRINT#-2,TAB(3);C$
130 PRINT#-2:PRINT#-2
140 NEXT A
150 CLS:INPUT"DO YOU WANT TO PRI
NT NEW LABELS (Y-N)";A$
160 IF A$="Y" THEN 40
170 END
```

Custom Cassette Labels

CoCo 3

By Travis Halbrook

If you love music as I do, then you probably make your own "party mix" tapes. Putting your favorite songs on one tape allows you to listen to the music you want without having to constantly switch cassettes. Unfortunately, the labels you stick on homemade tapes have to be made by hand, which gives them a very sloppy appearance. Let *Cassette Labeler* make neat, professional-looking cassette jackets for you.

After typing in and saving the program, type RUN and press ENTER. A model of a cassette label should appear onscreen, with a flashing, auto-repeating cursor in the middle. Just move the cursor wherever you want and type in the pertinent information. To print, press the SHIFT and down arrow keys at the same time.

The rectangle at the top of the screen represents the front of the label. This is where I put the names of the songs. The rectangle at the bottom represents the "spine" of the cassette label; I put the title of my tape in this part. Of course, it goes without saying that this program is not restricted just to creating jackets for music tapes. Run it for some of your custom "party mix" CoCo program tapes!

The Listing: CASSLBLR

```
10 '"CASSETTE LABELER" BY TRAVIS
 HALBROOK              COPYRIGHT
1988
20 ON BRK GOTO 360
30 POKE 65497,0:WIDTH 40:PALETTE
 0,0:PALETTE 8,63:CLS1
40 PRINT STRING$(40,"-");
50 FOR A=1 TO 17
60 PRINT ":
                   :";
70 NEXT A
80 PRINT STRING$(40,"-");
90 LOCATE 0,15
100 PRINT STRING$(39,"-");
110 LPOKE 443646,ASC("-")
120 LOCATE 8,21:PRINT"SHIFT/DOWN
 ARROW TO PRINT"
130 X=20:Y=12
140 LOCATE X,Y
150 IF PEEK(341)=247 THEN Y=Y-1
ELSE IF PEEK(342)=247 THEN Y=Y+1
 ELSE IF PEEK(343)=247 THEN X=X-
1 ELSE IF PEEK(344)=247 THEN X=X
+1
160 A$=INKEY$:IF A$<>"" AND A$<>
"^" AND A$<>CHR$(9) AND A$<>CHR$
(10) AND A$<>CHR$(8) AND A$<>"["
 THEN LPOKE 442368+X*2+Y*80,ASC(
A$):X=X+1
170 IF A$="[" THEN 210
180 IF X>39 THEN X=0:Y=Y+1 ELSE
IF X<0 THEN X=39:Y=Y-1
190 IF Y<0 THEN Y=0 ELSE IF Y>18
 THEN Y=18
200 GOTO 140
210 A$=""
220 LOCATE 7,20:PRINT"        PR
INTING                   "
230 POKE 150,176:'DOUBLE BAUD RA
TE FOR  HIGH SPEED
240 FOR Y=0 TO 18
250 FOR X=0 TO 39
260 A=LPEEK(442368+X*2+Y*80)
270 A$=A$+CHR$(A)
280 NEXT X
290 PRINT #-2,A$
300 A$=""
310 NEXT Y
320 FOR A=1 TO 3
330 PRINT #-2,":
 :                        :"
340 NEXT A
350 PRINT#-2,STRING$(40,"-")
360 POKE 65496,0
370 POKE 150,88 'RETURN BAUD RAT
E TO NORMAL SPEED
```

Knee-High to a Growth Chart

16K ECB

By Gay Crawford

Growth Chart is a handy program for those who are parents of young children. With a Gemini 10X printer and this program, you can print out an accurate height chart that will allow you to track your child's ascent into maturity.

If you don't have a Gemini, change the baud rate in Line 20 to that of your printer. The value is currently set as `150, 18` for 2400 baud. Poke these values in Line 20 for the following baud rates: `150,87` for 600 baud, `150,41` for 1200 baud, `150,7` for 4800 baud, and `150,1` for 9600 baud. You'll most likely need 600 baud because that is how fast CoCo is set to "talk" on power-up. Also, if your printer is not a Gemini, refer to your printer manual to replace the code in Line 30 with the proper code to change linefeeds to ¼ inch (but check the accuracy with a ruler or a yardstick).

Use tractor-feed paper, and consider reinforcing the page breaks with tape, or perhaps cover the entire chart with clear contact paper. Hang the chart on a wall so that the 2-foot mark is exactly 24 inches above the floor, have the youngster stand straight against the wall (no tippytoeing), make a mark at the youngster's head level, and write the day's date out to the side. There is plenty of room on the chart for comments, and you may want to let your child decorate it.

The Listing: `GROCHART`

```
10 'HEIGHT CHART PRINTER FOR GEM
INI 10X
20 POKE 150,18
30 PRINT#-2,CHR$(27);CHR$(65);CH
R$(18);' 1/4 INCH LINEFEEDS
40 CLS
50 LINEINPUT"ENTER NAME OF CHILD
: ";CN$
60 PRINT#-2,"Height Growth Chart
 for ";CN$
70 PRINT#-2:PRINT#-2
80 F=5:I=0
90 PRINT#-2,F" Feet    "I "inches"
;TAB(22);"----"
100 PRINT#-2,TAB(22);"-"
110 PRINT#-2,TAB(22);"--"
120 PRINT#-2,TAB(22);"-"
130 I=I-1:IFI<0 THENI=11:F=F-1
140 IFF>1 THEN 90
150 END
```

Brain Games

CoCo Says . . .

16K ECB

By Warren Massie

CoCo says . . . select the blue box in the lower-left corner. CoCo says . . . pick the red box in the lower-right corner. CoCo says . . . test your short-term memory with *CoCo Simon.*

CoCo Simon divides the screen up into four sections, each displaying a different color and sound. The top-left corner corresponds to the Q key, top-right to the W, bottom-left to A and bottom-right to S. The computer will flash one of the sections. Your job is to press the appropriate key. If your response is correct, it will add another sequence to the previous one, laying down a pattern for you to duplicate.

When run, the game begins immediately, so pay attention. After it finishes its display, there is a "dead" time in which it waits for your response. If you press the correct keys, the program adds another bit to the sequence. See how far you can go — most people run into a snag at about 10 items.

The Listing: `SIMON`

```
10 CLS 8:PRINT"COCO SIMON"
20 PRINT"            BY W.MASSIE"
30 FORX=1TO20:SOUND 100,1:SOUND9
0,1:NEXTX
40 PMODE 3,1:SCREEN 1,0:PCLS
50 '****************************
60 P=1:' FOR SOUND DELAY
70 DIM M$(99):C=0:CH=0
80 R=RND(4):A$="QWAS":C=C+1
90 M$(C)=MID$(A$,R,1)
100 C1=0:C2=0
110 '***************************
120 C1=C1+1:PCLS
130 IF M$(C1)="Q" THEN 190
140 IF M$(C1)="W" THEN 220
150 IF M$(C1)="A" THEN 250
160 IF M$(C1)="S" THEN 280
170 IF C1=C THEN 320
180 GOTO 120
190 COLOR 3,5
200 LINE(0,0)-(100,75),PSET,B
210 SOUND 100,P:GOTO 170
220 COLOR 2,5
230 LINE(100,0)-(200,75),PSET,BF
240 SOUND 125,P:GOTO 170
250 COLOR 3,5
260 LINE(0,75)-(100,150),PSET,BF
270 SOUND 150,P:GOTO 170
280 COLOR 4,5
290 LINE(100,75)-(200,150),PSET,
BF
300 SOUND 200,P:GOTO 170
310 '*****************************
320 C2=C2+1:PCLS
330 K$=INKEY$
340 IF CH<C2 THEN CH=C2
350 IF C2=C+1 THEN PCLS 2:FORX=1
TO20:NEXTX:GOTO80
360 IF K$="Q" OR K$="W" OR K$="A
" OR K$="S" THEN 370 ELSE 330
```

```
370 IF K$<>M$(C2) THEN CLS:GOTO4
30
380 IF K$="Q"THEN COLOR 3,5:LINE
(0,0)-(100,75),PSET,B:SOUND100,P
390 IF K$="W"THEN COLOR 2,5:LINE
(100,0)-(200,75),PSET,BF:SOUND12
5,P
400 IF K$="A"THEN COLOR 3,5:LINE
(0,75)-(100,150),PSET,BF:SOUND15
0,P
410 IF K$="S"THEN COLOR 4,5:LINE
(100,75)-(200,150),PSET,BF:SOUND
200,P
420 PCLS:GOTO 320
430 PRINT"WRONG, IT WAS THE ";M$
(C2);"-KEY.":SOUND 1,15
440 PRINT:PRINT"HIGHEST NUMBER O
F SEQUENCE(S)"
450 PRINT"REMEMBERED IS:";CH-1
460 PRINT:PRINT"DO YOU WANT TO P
LAY AGAIN (Y/N)?";
470 R$=INKEY$:IF R$="Y" THEN C=0
:CH=0:PMODE 3,1:SCREEN 1,0:PCLS:
GOTO80
480 IF R$="N" THEN END ELSE 470
```

Towers of Hanoi

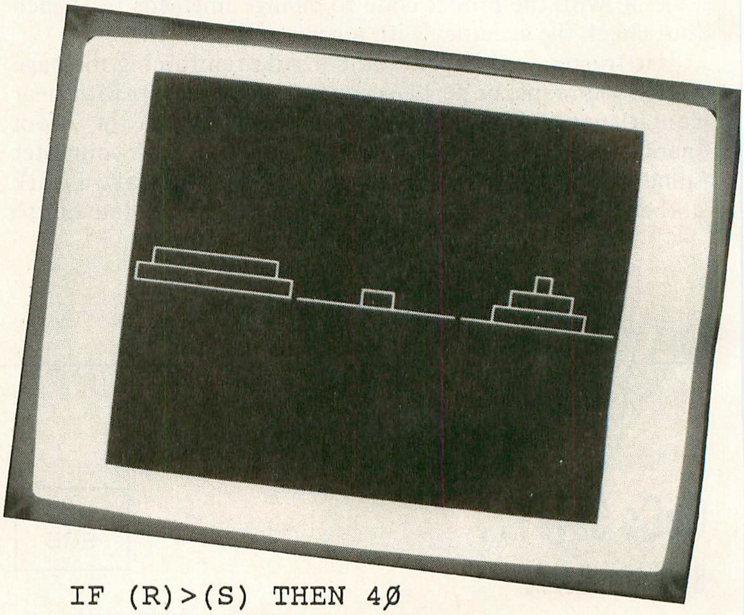
By Dan O'Brien

16K
ECB

Towers of Hanoi is a graphic brain-teaser that will surely get your mental gears to grinding. There are three "pegs"; on the peg on the left is a "pyramid" of discs, each disc being smaller than the one it rests on. The object is to move all the discs from the left peg to the right peg.

Three conditions: 1) only one disc can be moved at a time, 2) only the top disc of a stack can be moved, and 3) a disc cannot be stacked onto any disc that is smaller than itself. To play, use the 1, 2 and 3 keys (which represent pegs 1, 2 and 3).

Just press the number of the peg you want to move the disc from, then press the number of the peg you want to move the disc to. If a wrong number is pressed, or if you get the feeling the computer is locked up, press the zero (0) key and try again; the previous move will be ignored. The only advice I can give you is to be patient.



The Listing: HANOI

```
5 REM DEVELOPED BY DAN O'BRIEN
10 PMODE4,1:PCLS:SCREEN1,0
20 LINE(4,100)-(84,92),PSET,B:LI
NE(12,92)-(76,84),PSET,B:LINE(20
,84)-(68,76),PSET,B:LINE(28,76)-
(60,68),PSET,B:LINE(36,68)-(52,6
0),PSET,B:LINE(40,60)-(48,52),PS
ET,B:LINE(88,100)-(168,100),PSET
:LINE(172,100)-(252,100),PSET
30 L(1)=6:LD(2)=0:L(3)=0:LEV(1,1
)=6:LEV(1,2)=5:LEV(1,3)=4:LEV(1,
4)=3:LEV(1,5)=2:LEV(1,6)=1:H=0:A
=0:B=0:R=0:S=0:MOV=0
40 I$=INKEY$:IFI$=""THEN40
50 IFI$<>"1" AND I$<>"2" AND I$<
>"3" OR I$="0"THEN40
60 A=VAL(I$)
70 I$=INKEY$:IFI$=""THEN70
80 IFI$<>"1" AND I$<>"2" AND I$<
>"3" OR I$="0"THEN 40
90 B=VAL(I$)
100 IF (A)=(B) THEN40
110 IF L(A)=0THEN40
120 R=LEV(A,L(A))
130 IF L(B)<>0THENS=LEV(B,L(B)):
IF (R)>(S) THEN 40
140 MOV=MOV+1
150 IF R=1 THEN D=4 ELSE D=(R-1)
*8
160 IFA=1THEN P=44
170 IFA=2THEN P=128
180 IFA=3THEN P=212
190 H=100-(8*(L(A)-1))
200 LINE(P-D,H-1)-(P-D,H-8),PRES
ET:LINE-(P+D,H-8),PRESET:LINE-(P
+D,H-1),PRESET
210 L(B)=L(B)+1
220 IF B=1THENP=44
230 IF B=2 THEN P=128
240 IF B=3 THEN P=212
250 H=100-(8*(L(B)-1))
260 LINE(P-D,H)-(P+D,H-8),PSET,B
270 LEV(B,L(B))=R
280 LEV(A,L(A))=0
290 L(A)=L(A)-1
300 IF L(3) <>6 THEN40
310 CLS:PRINT"YOU HAVE DONE IT I
N:";MOV;" MOVES!
315 PRINT"ONLY:";MOV-63;" MOVES
TILL PERFECT"
320 PRINT"PRESS ANY KEY TO PLAY
AGAIN"
330 I$=INKEY$:IFI$=""THEN330
340 RUN
```

Boggling Your Mind

4K

By Russell Riley, Jr.

In *Heads Up*, players compete against time and each other to come up with as many words as possible from a grid of random letters appearing onscreen. The letters can be used only once and *must touch!* Each player should use a notepad and a pencil to jot down his or her words. When time runs out, a tone sounds and players compare their lists of words. Words that appear on other players' lists are cancelled out.

The Listing: HEADSUP

```
0 REM RUSSELL RILEY JR COPYRIGHT
 1988
1 CLS
3 DIM A$(100)
5 FOR X=1 TO 16
6 RESTORE
7 Y=0
10 Z=RND(70)
15 READ A$(X):Y=Y+1
16 IF Z=Y THEN NEXT X ELSE 15
20 FOR P=0 TO 169:NEXT P
50 PRINT @ 170,A$(1);" ";A$(2);"
 ";A$(3);" ";A$(4)
51 FOR P=177 TO 201:PRINT @ P,CH
R$(TR)
52 NEXT P
55 PRINT @ 202,A$(5);" ";A$(6);"
 ";A$(7);" ";A$(8)
56 FOR P=209 TO 233:PRINT @ P,CH
R$(TR):NEXT P
57 PRINT @ 234,A$(9);" ";A$(10);
" ";A$(11);" ";A$(12)
58 FOR P=241 TO 265:PRINT @ P,CH
R$(TR):NEXT P
59 PRINT @ 266,A$(13);" ";A$(14)
;" ";A$(15);" ";A$(16)
60 FOR P=273 TO M:PRINT @ P,CHR$
(TR)
61 NEXT P
65 T=T+1
70 IF T=18000 THEN SOUND 1,10
75 GOTO 65
100 DATA A,A,A,A,A,B,B,C,C,C,D,D
,E,E,E,E,E,E,E,E,F,F,G,G,G,H,H,I
,I,I,I,J,J,K,K,L,L,M,M,N,N,O,O,O
,O,O,P,P,P,Q,R,R,R,R,S,S,S,T,T,T
,U,U,U,U,V,V,W,W,X,Y,Z
```

Graphics

The Building Blocks of Graphics

16K

By Keiran Kenny

Color Blocks is a nice, *short* program suitable to introduce beginners to Lo-Res graphics. It uses Color BASIC's block graphics characters. After you load and run, you see an up-arrow cursor centered at the bottom of the screen. Press the appropriate arrow key and auto-repeating action will take you in whatever direction you want to go.

When you come to a good place to drop off a block, press a number key from 1 to 8, and CoCo will draw a block there in the color of the number you chose (1 is green, 2 is red, 3 is blue, etc.). The cursor will then reappear at the bottom of the screen, ready to travel to another position and place a block there. If you place the cursor over an existing color block, the block will be deleted.

Don't be dismayed if the cursor shoots off the top of the screen — it wraps around. Press the arrow key and it reappears at bottom center. With a little patience you can create attractive patterns. I drew a really impressive Christmas tree.

The Listing: CLRBLOKS

```
0 'COLRBLKS' by Keiran Kenny,
   Sydney, 1988.
10 CLS0
20 P=1520
30 POKEP,30
40 IFPEEK(341)=247THENP=P-32:POK
E(P),30:POKEP+32,128:GOTO100
50 IFPEEK(342)=247THENP=P+32:POK
EP,30:POKEP-32,128:GOTO100
60 IFPEEK(343)=247THENP=P-1:POKE
P,30:POKEP+1,128:GOTO100
70 IFPEEK(344)=247THENP=P+1:POKE
P,30:POKEP-1,128:GOTO100
80 K$=INKEY$:IFK$=<"0"ORK$>"8"TH
EN110
90 POKEP,127+16*VAL(K$):GOTO20
100 IFP<1024ORP>1535THENP=1520
110 FORD=1TO50:NEXT:GOTO40
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

Out of Sync

I would like to hook a 12-inch Samsung TTL (IBM type) monochrome monitor to my CoCo 3. This is a monitor with a 9-pin DB connector on the back, with provisions for intensity, video, H sync and V sync on pins 6, 7, 8 and 9 respectively. Pin 1 is ground.

Donald Bullock
Camden, Alabama

That monitor is rather hard to use with a CoCo 3 for two reasons. First, the monitor requires a digital TTL signal-level input (0 to 5 volts), while the CoCo uses an analog signal ranging from 0 to .9 volts. Second, that monitor is set up to work properly only when it receives a sync frequency of about 19 KHz. The CoCo sends out its video at a sync frequency of 15.75 KHz. It would require some special circuitry to get a decent image on that monitor. Even then, you'd only get three intensity levels at best (black, dim and bright). In addition, your picture would probably be small — occupying only the center portion of the screen — because of the discrepancy in the H sync frequencies. Someone with a good knowledge of analog and digital video and a moderate amount of time to tinker might be able to make such a converter circuit, but none is currently offered on the CoCo market. For all practical purposes, you cannot use that monitor with the CoCo at this time.

All or Nothing

I have a Disto 512K CoCo-upgrade board with no chips in it. Is it possible to temporarily populate it with 256K of memory?

Roger Wilkins
Sexsmith, Alberta

There is no intermediate amount of memory that can work on the CoCo 3. You must have either 128K or the full 512K. While in theory it might be possible to make a board that can be partially populated (probably using 4464-type chips), no one has bothered to do so. Such a board would be very expensive because it would need a number of chips in addition to the memory chips.

Solder Solution

I have found and solved the same nasty problem in two of my Tandon TM 100 series full-height drives. The problem involved intermittent failure of the drives. The drive motor-spindle would spin too fast, occasionally resulting in a crashed disk. When the drives failed, a sharp rap on the case would temporarily fix the problem. In both drives, the problem was caused by cold-solder joints between the motor-speed potentiometer (a rectangular blue component on the small motor-speed PC circuit board in the rear of the drive) and its circuit board. Remelting the solder joints for the potentiometer cured the problem. I suspect that other Tandon series 100 (TM 100-1, 100-2 and 100-4) drives might suffer from the same problem and be just as easy to fix.

Steve Goldberg
(W2IMF)
Bethpage, New York

Thanks for the solution. The Tandon TM 100 series drives (apart from that problem) are among the more reliable of the older technology full-height floppy drives. I used two of them for many years. While I never encountered that problem, perhaps others have.

Read Before You Write

How do I use the memory-management unit (MMU) of the CoCo 3 in writing assembly language programs?

H. Peters
Lantzville, British Columbia

First, you need a good reference on the GIME chip. Spectral Associates' *Super Extended* BASIC *Unraveled* (available from Microcom) is a good reference on the GIME chip. The book includes full specs on the chip and disassembly of the CoCo 3's ROM, including numerous examples of chip programming. The Tandy service manual for the CoCo 3, another good reference, can be purchased from either Microcom or your local Radio Shack store. (Radio Shack will have to order the book from National Parts in Texas.)

With these references in front of you, note that the memory manager is programmed by 6-bit data values written to registers $FFA0 through $FFAF. These sixteen registers set up two tasks, or masks, for mapping memory. The task being used (if any) is controlled by the task-select bit (Bit 0 of FF91) and the MMU-enable bit (Bit 6 of $FF90). If the MMU is disabled, then a third canned task is implemented, and the 6809's memory is mapped to the top 64K of the machine's physical memory (as if segments $38 through $3F were programmed into a select set of eight task registers).

A Moving Experience

Can I use an FD 501 and an FD 502 drive in the same cabinet as drives 0 and 1?

Oscar Dias
Aibonito, Puerto Rico

You can use the drives in the way you describe, but there are several difficulties in doing so. First, the FD 502 drive's power supply connector is physically different from that of the FD 501 drive. To use both in the same case, you would have to adapt or change the power supply connector on one or the other. Both use the same (+5 and +12) voltages at about the same amount of current, but the physical connector is different.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's *CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*

Second, if both the FD 501 and the FD 502 drive were originally Drive 0, you must remove a terminator resistor pack from one or the other. All drive systems have only *one* terminator resistor. (These resistor packs vary in their appearance. They may look like an integrated circuit in a socket, or a blob of epoxy with a single row of pins, also socketted.) In addition you need to alter the position of the drive-select jumpers on one or the other drive if both were originally Drive 0. Look for jumpers labeled DS0, DS1, etc. Change a jumper from DS0 to DS1 on one of the drives. On some brands of drives, the change will be from DS1 to DS2. While on some brands these jumpers can be moved by hand, on others you need to cut and resolder wires.

Back to Disk BASIC

I cannot get CoCo Max III *to work with my CoCo 3 and Disto Super Disk Controller whether I use my Disk BASIC ROM or CDOS-3.*

Art St. Amant
Elliot Lake, Ontario

CoCo Max III needs an almost totally standard disk ROM, so I am not surprised that it did not work with CDOS-3. I know of only one modified DOS that is compatible with *CoCo Max III* — the current release of ADOS-3. (To use that version, you must use the optional Disable feature.) I see no reason why it should not work properly if you are using a vanilla, unmodified Radio Shack Disk BASIC ROM.

However, since you say you are using a Disto Super Controller, I assume your Disk BASIC ROM is a 28-pin EPROM, which means that anyone could have altered it subtly. You need to try what you *know* is a completely unaltered version of Disk BASIC in the controller. If that doesn't work, call Colorware, which sells the product. It's worth the trouble. *CoCo Max III* is a fine product.

Analog vs. Digital

I just purchased a Tandy 1000 HX computer and discovered that my CM-8 RGB monitor would not work with it. Is there any way to fix this? Also, can I use a couple of old gray full-height drives with my Tandy FD 501 two-drive system?

W.J. Martin
Key Largo, Florida

The CM-8 accepts only an analog signal. The PC-compatible you bought puts out a CGA (a four-bit digital RGB) signal. The two signal protocols are not really compatible because they work at different voltage levels and select colors in different ways. This is one of the reasons I have suggested to readers that they consider getting a Magnavox or Sony monitor instead of the CM-8. Those monitors offer compatibility with both types of signal protocol.

I have heard from one user who hooked his Tandy 1000's R, G and B lines and H and V sync lines to the corresponding input lines on his CM-8 and got a usable picture. Remember: Because the CM-8 cannot handle the intensity line from the Tandy 1000, you can only get six colors and black and white this way. In addition, when using the CM-8 in this fashion, you are driving inputs designed for signal levels of 0 to .9 volts with signals that go as high as 4 volts. Prolonged use might damage the input chip on the CM-8. The user who reported this experiment said things had been fine for a few months. To make this modification, you need to be comfortable cutting on the CM-8 cable and arranging for your own connectors. In effect, you need to be a hardware tinkerer of at least modest ability.

As for using the old gray drives, I recommend you just forget about them. Those particular drives are notoriously unreliable machines. It is possible to do as you suggest. However, the old Tandy full-height drives were selected via missing teeth in the connector, while the new half-height drives are selected via jumpers on the drive's circuit board. This makes it necessary to do some tinkering to put together the system you describe. And, of course, you'd have to yank the terminator resistor from your gray Drive 0.

CoCo 3 Inputs

A note to hardware hackers looking for inputs to the CoCo 3: Unlike on the CoCo 1 and 2, there are four unused pins on the CoCo 3's IC4 (the 68B21 PIA) that can be used as inputs if the bits are set as such. These lines were used to drive the VDG chip on the older CoCos, but that function is now done inside the GIME chip. You can't use those lines as outputs. If you do that, you will be writing to registers inside the GIME chip that mimic the functions of the old VDG chip. However, if used as inputs, these lines constitute four valid TTL inputs. The lines in question are PB 4 through PB 7. Note that PB 3, wired to a pull-up system and Pin 10 of the RGB port, is not used by any hardware or software made by Tandy or anyone else. Hackers may want to free that line to get a fifth PIA line. (This line could be used as either an input or an output.) Use Pin 10 of the RGB port to supply +5 volts to sync converters or to output composite sync generated with your own circuit.

Hackers should also beware: There have been reports of several devices that worked on the CoCo 1 and 2 but don't work properly on the CoCo 3. This may include some releases of the FD 501 and FD 502 shortie controller from Tandy. Problems have been traced to an apparent difference in the timing of the SCS (Spare Cartridge Select) line on the CoCo 2 and CoCo 3. The problems appear to be cured if one gates the SCS line with the high part of the E clock line. One NOR and two inverter gates could be used to accomplish this.

Steve Bjork
(6809ER)
SRB Software
Palmdale, California

Thanks for those tips, Steve. I have been using Pin 10 of the RGB port for composite sync (which I generate using a 74LS02 chip I piggy-backed on the 74LS04 in the CoCo) for about a year now. I encountered the same problem you describe when a device I was prototyping worked fine on a CoCo 1 and 2 but not on a CoCo 3. The problem was cured when I gated the SCS line with the E clock, as you suggest. So my experience indicates there are real timing differences between the SCS line on the CoCo 1 and 2 and the CoCo 3. Does anyone out there have a nice high-frequency scope and want to report more conclusive details?

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even duiring disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

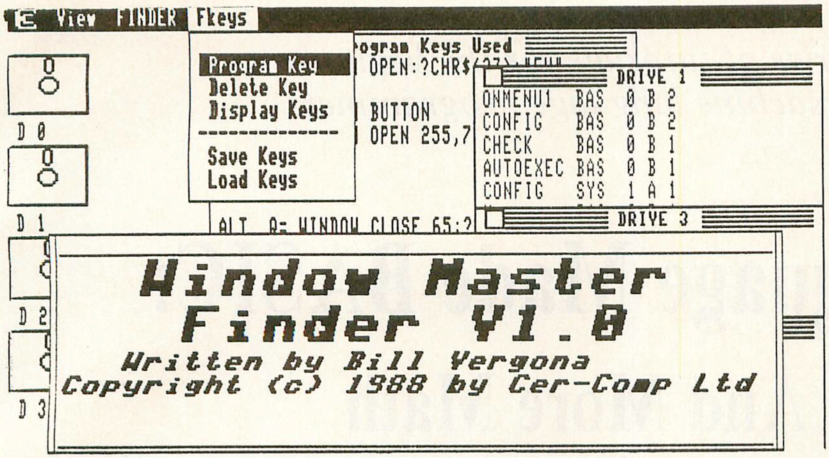
- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.
To Order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST)

CER-COMP LTD.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
(702) 452-0632

"Window Master"



```
ogram Keys Used
| OPEN:?CHR$(27);"FUU"
| BUTTON
| OPEN 255,7
ALT  0= WINDOW CLOSE 65:?
```

```
DRIVE 1
ONMENU1  BAS  0 B 2
CONFIG   BAS  0 B 2
CHECK    BAS  0 B 1
AUTOEXEC BAS  0 B 1
CONFIG   SYS  1 A 1
DRIVE 3
```

Window Master
Finder V1.0
Written by Bill Vergona
Copyright (c) 1988 by Cer-Comp Ltd

Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occured.

Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line, toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

Window Master Features

Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

Pull Down Menus

Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.

Window Master Applications

Window Master pushes the Color Computer 3 far beyond its normal capabilities, into the world of a "User Friendly" operating enviornment. We are already planning several new programs for use with Window Master. So you don't have to worry about having to write all your own programs. And don't forget that many existing Basic and M.L. programs will run under Window Master with little or no changes. The Possibilities for Application programs are endless: Spread Sheets, Word Processing, Communications, Education, Games, Graphic Design, Desk Top Publishing and on and on.

Hardware Requirements

Window Master requires 512K of memory, at least 1 Disk Drive, a Hi-Res Joystick Interface and a Mouse or Joystick.

Technical Assistance

If you run into difficulty trying to use some of Window Master's features, we will be happy to assist you in any way possible. You can write to us at the address below or call us between 10am and 2pm Pacific Standard Time for a more timely response. Sorry, no collect calls will be accepted.

Ordering Information

To order WINDOW MASTER by mail, send check or money order for $69.95, plus $3.00 for shipping & handling to the address below. To order by VISA, MASTERCARD or COD call us at (702)-452-0632
(Monday thru Saturday, 8am to 5pm PST)

CER-COMP Ltd.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
(702)-452-0632

16K ECB

The eighth in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC:

Part VIII: And More Math

By William P. Nee

Because the computer uses the Base 2 system, math problems involving multiplying or dividing by two are very easy. Shifts are a quick way to multiply or divide registers A, B, or D by two. The LSR (logical shift right) command will shift each bit in registers A or B to the right, effectively dividing either by two; however, any remainder is lost. As the following example illustrates, the right bit (Bit 0) of the register goes to the *carry bit* of the CC register, and the left bit (Bit 7) becomes a zero:

Register A = 10101010 = 170
LSRA = 01010101 = 85
Carry Bit = 0

Notice that the carry bit of the CC register is now a zero. When signed numbers are used, the ASR (arithmetic shift right) works the same way as LSR except that Bit 7 (the sign bit) stays the same, so the sign of the number will remain unchanged.

An LSL (logical shift left) will multiply register A or B by two. This time, Bit 0 will become a zero and Bit 7 will be stored in the carry bit of the CC register. An ASL (arithmetic shift left) does exactly the same function as an LSL; neither will retain the sign bit. Instead, it is stored in the carry bit, as shown by the following:

Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

Register B = 01010101 = 85
LSLB = 10101010 = 170
Carry Bit = 0

The following two branch commands are useful if you want to check the carry bit:

BCC — branch if the carry bit is clear (=0)
BCS — branch if the carry bit is set (=1)

There is no specific command to shift Register D. Therefore, if your number uses both registers A and B, to shift Register D you must use both shift and rotate functions. Rotating (ROR, ROL) either register A or B will shift all of the bits one space. The empty bit will be filled by the value in the carry bit, and the bit that is lost will go to the carry bit. To perform a right shift on Register D, you must complete the following functions:

(For Unsigned Numbers)	(For Signed Numbers)
LSRA	ASRA
RORB	RORB

Let's try an example. If we load Register D with #938, our computer will follow these instructions:

	Register	Carry Bit:	Register
	00000011		10101010
LSRA	00000001	1	10101010
RORB	00000001		11010101

The one in Bit 0 of Register A went to the carry bit after the LSRA operation and then to Bit 7 of Register B after the RORB function. These two operations have divided the number in Register D by two. Repeating will continue to divide the number by two. To multiply Register D by two, perform a logical shift left on Register B (LSLB), and then rotate Register A to the left (ROLA).

These two routines perform the function opposite that of the routines in the division example. Continued operations will continue doubling the number. Of course, in either multiplication or division, if you keep repeating the same routine, you will get an incorrect result. Not only can registers A, B and D be shifted and rotated, but memory locations can be shifted or rotated to the right or left as well.

You may also use the floating point format (FP1) to multiply or divide. Location $4F is the exponent of the number in FP1, and changing this will change the number. Adding one to $4F is the same as multiplying that number by two to the first power; adding an eight would multiply the number by two to the eighth power, or 256. Subtracting two from $4F would divide the number by four. You can do these operations by performing the following operations:

LDA $4F	exponent of the number in FP1
ADDA #8	multiply by 256
STA $4F	new number is in FP1

Sugar Software

☞ So, what is the Calligrapher anyhow? ☜

The Calligrapher is a program that allows you to print signs, labels and other things, using ornate, decorative and fancy type-styles (fonts) on a dot-matrix printer. The Calligrapher comes with 3 fonts but many more are available. The Calligrapher runs on either RSDOS (simple and easy) or OS9 (powerful and complex). The OS9 Font Massager lets you create your own fonts or modify existing fonts. See below for more info.

CALLIGRAPHER

CoCo Calligrapher - Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon.* The letters are ½ inch high and variably spaced. Works with many printers such as Epson, Gemini and Radio Shack. Additional fonts are available (see below). Tape/Disk; **$24.95.**

OS9 Calligrapher - Prints all the same fonts as the CoCo Calligrapher. It reads a standard text file which contains text and formatting codes. You may specify the font to use, change fonts at any time, centering, left, right or full justify, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX systems. Includes the same 3 fonts and additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95.**

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** (9 fonts) Reduced and reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** (8 fonts) Old Style and Broadway; **Set #3** (8 fonts) Antique and Business; **Set #4** (8 fonts) Wild West and Checkers; **Set #5** (10 fonts) Stars, Hebrew and Victorian; **Set #6** (8 fonts) Block and Computer; **Set #7** (5 *small* fonts) Roman, Italics, Cubes, Digital and Old World. ☞ **NEW: Set #10** (8 fonts) several Roman styles; **Set #11** (10 fonts) Gothic and Script; **Set #12** (10 fonts) more Roman and Italic.

Economy Font Packages on disk; specify RSDOS or OS9; **29.95** each or **$59.95** for all three: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts). **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts). **Font Package #4** (also known as the *Hershey* fonts) - Above font sets 10, 11 and 12 (28 fonts).

Calligrapher Combo Package - Includes the Calligrapher and Economy Font Packages #1 and #2, 54 fonts in all **$69.95**, or **$84.90** to also include Package #4 (82 fonts).

Sample Calligrapher Hershey Fonts

The CoCo Calligrapher!

NEW! OS9 Font Massager - This OS9 utility program allows you to do all sorts of things to Calligrapher font files. You may create new fonts, modify existing fonts, invert fonts, compress fonts, double the height and/or width, halve the height and/or width and convert between OS9 and RSDOS formats. **$19.95** (or only **$14.95** if ordered with any other *Calligrapher* item). A listing of the C source code for the Font Massager is available for an additional **$14.95.**

INFORMATION MGT.

TIMS (The Information Management System) - Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95.**

TIMS Mail - Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95.**

TIMS Utility - Utility companion for TIMS and TIMS Mail for multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95.**

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95.**

EDUCATIONAL

Trig Attack - Ages 9 and up. An educational arcade game where players learn important math concepts as they play. Sound effects, colorful graphics. Excellent manual includes an introduction to trigonometry. Tape/Disk; **$19.95.**

The Educational Combo - The Combo includes these educational (and entertaining) games:
Silly Syntax (ages 5 and up) story creation game with 2 stories
Galactic Hangman (ages 7 and up) animated graphics, with a 700 word vocabulary
The Presidents of the USA (ages 10 and up) a presidential trivia game
The Great USA (ages 9 and up) a trivia game of the states
Trig Attack (ages 9 and up) Zap those *Trigs*

All five programs on one disk; **$49.95** (save $50!).

SPECIAL INTEREST

Rental Property Income and Expense Management Package - Maintain rental property income and expense records and print reports. 28 expense categories. *This program may be tax deductible.* Disk only; **$29.95.**

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights of yarn; 8 sizes from baby to man. Tape/Disk; **$19.95.**

RAINBOW
CERTIFICATION
SEAL

MasterCard

VISA

*TRS-80 is a trademark of Tandy Corp.

SUGAR SOFTWARE
P.O. Box 7446
Hollywood, Florida 33081
(305) 981-1241

All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add $5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

There is no division command in either BASIC or machine language that does not use *FP1*. The program at the end of this article will divide a one-byte unsigned number by another unsigned one-byte number. The result will be a two-byte number in Register D. Register A will hold the whole number, and Register B will hold the decimal. Remember, they both are Hex numbers. A .8 in Hex is 8/16 (or .5 in Base 10). A .C is 12/16 in Hex (or .75 in Base 10).

We will use the second half of this program in a future article to compute the slope of a line. Load Register A (the dividend) and Register B (the divisor) with different numbers to make sure you understand the results.

(Questions and comments concerning this tutorial may be directed to the author at Route 2, Box 216 C, Mason, WI 54846-9302. Please include a self-addressed, stamped-envelope when requesting a reply.) □

The Listing: SHIFTS

```
3000                00100          ORG     $3000
3000 7F    3053     00110 START    CLR     WHOLE
3003 86    FF       00120          LDA     #255     DIVIDEND EXAMPLE
3005 C6    7F       00130          LDB     #127     DIVISOR EXAMPLE
3007 F7    3054     00140          STB     DIVSR    SAVE THE DIVISOR
300A B1    3054     00150          CMPA    DIVSR
300D 25    23       00160          BLO     DIVID2   IT'S A FRACTION
300F 27    3D       00170          BEQ     SAME     IT'S = 1
3011 C6    08       00180 DIVID1   LDB     #8       DO IT 8 TIMES
3013 F7    3052     00190          STB     COUNT
3016 1F    89       00200          TFR     A,B      PUT DIVIDEND IN REGISTER B
3018 4F             00210          CLRA
3019 58             00220 LOOP1    ASLB             SHIFT REGISTER B TO THE LEFT
301A 49             00230          ROLA             SHIFT REGISTER A TO THE LEFT
301B B1    3054     00240          CMPA    DIVSR
301E 25    04       00250          BLO     CONT1
3020 B0    3054     00260          SUBA    DIVSR
3023 5C             00270          INCB             INCREASE THE QUOTIENT
3024 7A    3052     00280 CONT1    DEC     COUNT    FILLED THE BYTE YET?
3027 26    F0       00290          BNE     LOOP1
3029 F7    3053     00300          STB     WHOLE    SAVE THE WHOLE NUMBER
302C 4D             00310          TSTA             ANY REMAINDER?
302D 26    03       00320          BNE     DIVID2   IF SO, COUNTINUE DIVIDING
302F 1E    89       00330          EXG     A,B      REGISTER D HAS THE RESULTS
3031 3F             00340          SWI
3032 C6    08       00350 DIVID2   LDB     #8       DO IT 8 MORE TIMES
3034 F7    3052     00360          STB     COUNT
3037 5F             00370          CLRB             LEAVE ROOM FOR THE QUOTIENT
3038 58             00380 LOOP2    ASLB             MOVE QUOTIENT OVER
3039 49             00390          ROLA             SHIFT REGISTER A TO THE LEFT
303A 25    05       00400          BCS     LOOP3    BRANCH IF THERE'S A CARRY
303C B1    3054     00410          CMPA    DIVSR
303F 25    04       00420          BLO     LOOP4
3041 B0    3054     00430 LOOP3    SUBA    DIVSR
3044 5C             00440          INCB             INCREASE THE QUOTIENT
3045 7A    3052     00450 LOOP4    DEC     COUNT    FINISHED DIVIDING YET?
3048 26    EE       00460          BNE     LOOP2
304A B6    3053     00470          LDA     WHOLE    GET THE WHOLE NUMBER
304D 3F             00480          SWI              REGISTER D HAS THE RESULTS
304E CC    0100     00490 SAME     LDD     #$0100
3051 3F             00500          SWI
3052                00510 COUNT    RMB     1
3053                00520 WHOLE    RMB     1
3054                00530 DIVSR    RMB     1
           3000     00540          END     START

00000 TOTAL ERRORS
```

Train for a High-Paying Career as a Computer Service Technician

Only NRI teaches you to service all computers as you build your own fully XT-compatible micro—now with 512K RAM and 20 meg hard drive!

Jobs for computer service technicians will almost double in the next 10 years according to Department of Labor projections, making computer service one of the top 10 growth fields in the nation.

Now you can cash in on this opportunity—either as a full-time industry technician or in a computer service business of your own—once you've mastered electronics and computers the NRI way.

Get inside the powerful, fully XT-compatible Packard Bell computer system

To give you hands-on training with the absolute in state-of-the-art computer technology, NRI includes the powerful new Packard Bell VX88 computer as the centerpiece of your training. You build this 512K, fully IBM PC/XT-compatible computer from the keyboard up, plus you now go on to install a 20 megabyte hard disk drive to complete your total computer system.

Understanding you get only through experience

You need no previous background in electronics to succeed with NRI. You start with the basics, rapidly building on the fundamentals of electronics with bite-size lessons. You perform hands-on experiments with your NRI Discovery Lab® and then move on to master such advanced concepts as digital logic, microprocessors, and computer memories.

Learn at home in your spare time

With NRI, you learn at your own convenience in your own home. No classroom pressures, no night school, no need to quit your present job until you're ready to make your move. And all throughout your training you've got the full support of your personal NRI instructor and the entire NRI technical and support staff. They're always ready to answer your questions and help you whenever you need it.

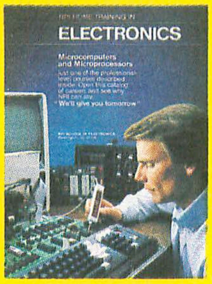
Get all the facts from NRI's free 100-page catalog. Send today!

Your incomparable hands-on training includes all this:

NRI's unique Discovery Lab® lets you design and modify circuits, diagnose and repair faults • Hand-held digital multimeter, complete with "talk-you-through" instructions on audio cassette • Digital logic probe lets you visually examine computer circuits • The latest Packard Bell VX88 computer with "intelligent" keyboard and 5¼" floppy disk drive • 20 megabyte hard disk drive you install internally • 16K ROM, 512K RAM • MS-DOS, GW-BASIC, and exclusive word processing, database, and spreadsheet software • Reference manuals, programming guidelines, and schematics.

See other side for highlights of NRI "hands-on" computer training →

SEND CARD TODAY FOR FREE NRI CATALOG



COMPUTERS AND MICROPROCESSORS

This training prepares you to service all computers as you build your own fully IBM PC/XT-compatible computer. Total systems training includes 5¼" floppy disk drive, 20 meg hard disk drive, monitor, test equipment, software, and the NRI Discovery Lab®.

☑ **Check one FREE catalog only.**

- ☐ **Computers and Microprocessors**
- ☐ TV/Video/Audio Servicing
- ☐ Robotics
- ☐ Security Electronics
- ☐ Electronic Music Technology
- ☐ Basic Electronics

Name (Please print) Age

Address Telephone ( )

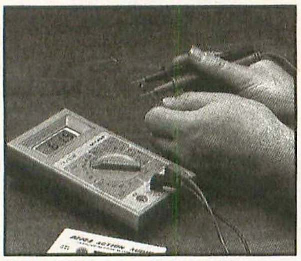
City State Zip

For career courses approved under GI Bill ☐ check for details.

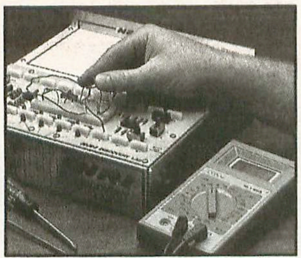
205-029

Accredited by the Accrediting Commission of the National Home Study Council

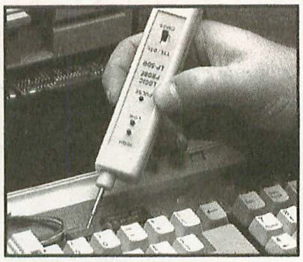
Get In-Demand Computer Servicing Skills With NRI "Hands-On" Training



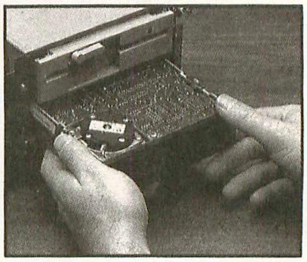
Using NRI's unique Action Audio Cassette, you're talked through the operation and practical applications of your hand-held digital multimeter—the basic, indispensable tool for the computer specialist.



You set up and perform electronics experiments and demonstrations using your NRI Discovery Lab®. You even interface the lab with your computer to "see" keyboard-generated data.



After you build this digital logic probe, you explore the operation of the Packard Bell detached "intelligent" keyboard and its dedicated microprocessor.

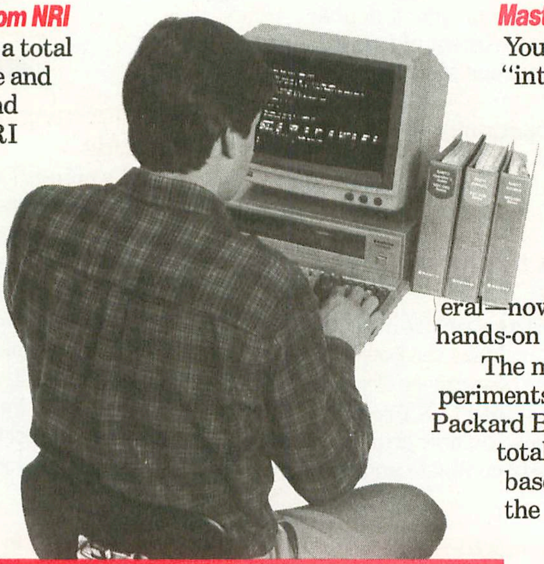


Next, you install the 5¼" floppy disk drive, learning disk drive operation and adjustment. You later improve your data storage capacity dramatically by installing a powerful 20 meg hard drive.

Total Computer Systems Training, Only From NRI

No computer stands alone . . . it's part of a total system. So if you want to learn to service and repair computers, you have to understand today's computer *systems.* And only NRI builds meaningful training around just such a powerful computer system—the new Packard Bell VX88 computer, complete with monitor, floppy disk drive, hard disk drive, and valuable software—all yours to train with and keep.

The VX88 features full IBM PC/XT compatibility, the breakneck speed of an advanced CMOS V40 CPU, and big-system raw power: 512K RAM and full expandability for future system growth.



Mastery Is "Built-In"

You assemble the Packard Bell "intelligent" keyboard, install the power supply and 5¼" floppy disk drive, and attach the high-resolution monitor. You then go on to install a powerful 20 meg hard drive—today's most-wanted computer peripheral—now included as part of your NRI hands-on training.

The many demonstrations and experiments you perform as you build your Packard Bell computer system give you a total mastery of computer operation, based on a thorough knowledge of the intricacies of computer theory.

SEND CARD TODAY FOR FREE NRI CATALOG

100-Page Free Catalog Tells More . . . Send Today!

Send the postage-paid card today for NRI's free 100-page catalog that gives all the facts about NRI computer training, plus career training in robotics, TV/video/audio servicing, electronic music technology, and many other fields. If the card is missing, write to NRI at the address below.

IBM is a registered trademark of International Business Machines Corp.

NRI School of Electronics
McGraw-Hill Continuing
Education Center
4401 Connecticut Avenue, NW
Washington, DC 20008

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 10008 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

NRI School of Electronics
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20077-3543

DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Moving Files

I recently purchased a Tandy 1000 SX, and would like to transfer many of my CoCo files to it. How can I do this?

Milton Simpson
Big Flats, New York

℞ A really versatile transfer program, *Xenocopy-PC*, can be used to copy floppy disk files to your 1000 from Color Computers, TRS-80 Model IIIs and 4s, Kaypros, etc. It is priced at $79.95 plus $3 S/H from Microcom Software, 2900 Monroe Ave, Rochester, NY 14618 (716) 383-8830. Microcom also sells *CoCo Util II*, a less expensive program limited to CoCo disks ($39.95 plus $3 S/H).

A *ProComm* Workalike

Is there a program like ProComm *available for the CoCo 3, now that it has 80 columns with color?*

Jonathon Graff
Bronx, New York

℞ *Telstar 3.2* is virtually *ProComm* for the CoCo 3 under OS-9 Level II. Like *ProComm*, it has an autodialer, help menus, direct download to disk with both Xmodem and Ymodem, chat mode, etc. It does not have a programming language for unattended operation, or VT-100 emulation, but unlike *ProComm*, you have the CoCo's magic CLEAR key to switch windows while online. One of the best features of this program is that you can download it from Delphi or get it from the author for $10 plus return postage. Please include a formatted disk. Requests may be directed to Merle Kemmerly III at 2213 Shed Road #250, Bossier City, LA 71111.

A Radio Shack Cure

Is there any way to get OS-9's Profile *(Cat. No. 26-3247) to run under OS-9 Level II?*

David Bacus
Detroit, Michigan

℞ The following fix is prescribed by Radio Shack Computer Customer Service in Ft. Worth, Texas (817-390-3861): First boot OS-9 Level II, then format a blank disk in `/d1`. Type `LOAD BACKUP` and then use that command to back up your original copy of OS-9 *Profile*. Bring up BASIC09 and at the `B:` prompt, type the following: `e fixprofile` and press ENTER. Then using the built-in editor, enter the following program:

```
DIM path,newval:INTEGER
DIM profilecrc(3),mgtcrc(3):
  BYTE
newval:=$2041
DATA $8A,$E5,$C0,$6B,$75,$A9
FOR count:=1 TO 3
READ profilecrc(count)
READ mgtcrc(count)
NEXT count
OPEN #path,"/d0/cmds/profile":
  UPDATE
SEEK #path,$11EA
PUT #path,newval
SEEK #path,$64E4
PUT #path,profilecrc
CLOSE #path
OPEN #path,"/d0/cmds/mgt":
  UPDATE
SEEK #path,$0506
PUT #path,newval
SEEK #path,$1D55
PUT #path,mgtcrc
CLOSE #path
```

With the previously backed-up copy of OS-9 *Profile* in Drive 0, run the program to make the required patches.

Automation Routine

Is there any way to automatically have my programs `PCLEAR0` *with Disk* BASIC*?*

Mary Willingham
Omaha, Nebraska

℞ Place the following routine at the beginning of your program. It will cause the program to relocate itself to Location &H0E01.

```
10 GOTO 5000
20 DATA BD.B3.ED.1F.02.7E.96.A7
30 RESTORE:FOR X=0 TO 7:READE$:NEXT
40 '*****************************
50 ' PLACE YOUR PROGRAM HERE
60 '*****************************
5000 CLEAR200:FOR I=0 TO 7‘:READ E$
5010 POKE&HE01=I,VAL ("&H"=E$):NE
XT
5020 DEFUSR0=&H01:X=USR0(&HE09)
5030 GOTO 30
```

This is equivalent to `POKE 25,14:POKE &HE00,0:NEW`, which increases the RAM directly available to BASIC from Locations 22824 to 28968. The CoCo 2 graphic modes are not available after these pokes; however, on a CoCo 3, the new graphic modes are still available.

Parent/Child Conflict

I am having a problem using the system call `os9fork`*. I experience the problem only when I do not follow it with a wait statement. What is the problem?*

Herve R. Bernier
Aulnaies, Quebec

℞ With both parent and child processes running in parallel, be sure that they don't both try to access the same I/O paths.

Gaining Access

How can I access the second side of a double-sided disk drive under OS-9 Level II? I have a CoCo 3 with an FD 501 drive. Drive 1 is my double-sided drive. ADOS 3 under Disk BASIC *accesses the drive, but under OS-9 there doesn't seem to be any instructions for*

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

adding the proper device descriptor to boot the drive. I have seen references to such a descriptor from time to time in manuals and in RAINBOW, *but I'm stumped. I would like to change the drive step rates as well, but again I cannot find the necessary information.*

William Charles Sarn
Barrington, Rhode Island

℞ There are more elegant ways to do this, but here's one way to access Side 2 of your double-sided drive: Boot up by typing `DOS` while your 35-track system disk is in Drive 0 and a freshly formatted disk is in Drive 1. After entering the date, type the following:

```
MODPATCH -S
L D1
C 18 23 50
C 19 1 2
V
```

Press CTRL, then BREAK, and then type the following:

```
CHD /D0
COBBLER /D1
DSAVE /D0 /D1!SHELL
```

You now have a 35-track bootable system disk in Drive 1 that will access Drive 1 as a 40-track double-sided disk drive. With the new system disk, you can read 35- or 40-track single- or double-sided disks with your 40-track double-sided drive. By adding an additional line to this `Modpatch` procedure, you could also change the step rate of your drive from 30ms to 20ms, 12ms or 6ms. Just change the value at Offset 14 from 0 to 1, 2 or 3 respectively.

Keyboard Alterations

Can my CoCo 2's HJL keyboard be installed directly into a CoCo 3? I have used my HJL for years and love the feel of a "regulation" keyboard. I plan to buy a CoCo 3 soon and would like to know if the keyboards are interchangeable.

Larry Donovan
Stonington, Connecticut

℞ I am currently using my old HJL keyboard with my CoCo 3 for much the same reason. You can break the plastic latch from under the F2 key so it doesn't lock. I swapped the keycaps so F1 and F2 are on the right. This is where HJL electrically puts the CoCo 3's F1 and F2. The two function keys on the left are the CoCo 3's ALT and CTRL keys, which I repainted.

A Modified Boot

Is there a way to get OS-9 Level II to boot up in 80 columns in RGB mode?

Ralph Ramhoff
Columbia, Maryland

℞ Patches are needed for `Term` (80 columns, blue on white) and `CC3IO` (RGB on boot). The `Modpatch` scripts are as follows:

```
L Term
C 2C 28 50
C 30 01 02
C 33 02 01
C 34 03 08
C 35 03 08
V
L CC3IO
C 90 86 CC
C 92 A7 78
C 93 88 ED
C 94 3D 88
C 95 86 3D
C 96 78 12
C 97 A7 B7
C 98 88 10
C 99 3E 09
V
```

Use `Cobbler` to save the modified `OS9boot` to disk. As an alternative, load `PMPTS` from your *Multi-Vue* disk. This file contains the `SAVE` command. After running a `Modpatch` script, `SAVE` lets you save the modified code to disk.

Gain Control

I have a CoCo 3, and none of the control keys seem to work. Is there anything I can do?

Marty Mitchell
Covina, California

℞ The keys ALT, CTRL, F1 and F2 occupy addresses 341, 342, 343 and 344 of the keyboard roll-over table. When any one of these keys is depressed, the value at its corresponding address in the keyboard roll-over table changes from 255 to 191. You can use this fact in writing your own programs by using the `PEEK` function to detect when one of these keys is pressed.

Are They Compatible?

I have recently purchased a new Color Computer 3. I hooked up my RS-232 pack to it, expecting them to be compatible. However, when I typed in `EXEC&HC000`, *the computer refused to operate the interface. When testing the connection and the dip switches, I noticed that the pack worked only during the computer's first cold start.*

I thought that all of Radio Shack hardware is compatible with the CoCo 3. Is there any way I can fix the Radio Shack Deluxe RS-232 Pak so that it won't lock up on me after the first cold start?

Daryl Fortney
Lancaster, Philadelphia

℞ That program pack will run with the command statement `EXEC&HE010` instead of `&HC000`. The best way to utilize your RS-232 Pak with the CoCo 3 is with a Multi-Pak Interface (upgraded for CoCo 3 use) and a real terminal program with 80 column support and Xmodem upload/download protocol. There are many of these available, and they will bring much more satisfaction.

Harmless Bug

I keep getting a Retry prompt while formatting or verifying all disks on OS-9 Level II. This prompt occurs only on doubled-sided 80-track operations on tracks 70 and 71 (HEX). I've tried three different disk controllers and removed the Multi-Pak. The Retry prompt occurs on both `/d0` *and* `/d1`, *and it does not occur under single-sided operation on Levels I or II or with* `80 TRK` *patches under Disk* BASIC. *The prompt doesn't seem to hurt anything, only occurs once, and the process always continues past the error. Is this a bug in OS-9 Level II software?*

℞ It's not really a Retry. A Retry is when an I/O error occurs and the disk is reread or rewritten. In this case, OS-9 is temporarily going back to Track 0 to allocate another sector for the sector allocation table. Technically you could call this a bug, because the `Format` command does not anticipate the need for the extra space with 80-track double-sided disks. But it's a harmless one.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

Prospect, Kentucky

Reporter: Lauren Willoughby

RAINBOW
FEST
PRINCETON
Oct. 21-23

R·E·P·O·R·T·E·R

®Falsoft Inc.. All Rights Reserved

RAINBOWfest 16 Marks Year of the Hard Drive

Where were you the weekend of Friday, October 21? If you were in Princeton, New Jersey, you were in the right place for the 16th edition of RAINBOWfest, a biannual bash of CoCo community — and the biggest collection of CoConuts under one roof.

From 7 p.m. Friday until 3 p.m. Sunday, the show hall buzzed with constant activity as CoCoists and Color Computer software programmers, hardware designers, RAINBOW personalities and vendors came together in celebration of our favorite computer.

People who came looking for bargains weren't disappointed, and neither were those who came in search of enlightenment. Fourteen Color Computer notables — including **Dr. Martin H. Goodman, M.D.**, **Dale Puckett**, **Steve Bjork** and **Rick Adams** — gave seminars on topics ranging from programming and marketing commercial software to windowing under the *Multi-Vue* environment. Anyone with a CoCo question was sure to find an answer from the think tank assembled there.

People who came looking for sustenance in addition to 6809-oriented fellowship found it at the traditional CoCo Community Breakfast. Keynote speaker **Richard White** talked on the evolution of the CoCo, calling on his acquaintance of the machine from its 4K fledgling stage to the full-blown power user's tool it is today.

People who came looking for excitement experienced sensory overload — there were at least 27 CoCos up and running the latest in CoCo software. From desktop publishers to hot new ML games to MIDI to the newest rage, hard drives, it was all on display at RAINBOWfest Princeton.

RAINBOWfest

Thousands turned out for RAINBOWfest Princeton.

Dick White: A man whose spectacles defy gravity.

Digging In at the CoCo Community Breakfast

If you were asked to write down a list of all the biggest names in the world of the Color Computer today, you would probably have found most of those people seated at a breakfast table in Princeton, New Jersey, October 22, 8:15 a.m., partaking of bacon, eggs, donuts and coffee.

Dignitaries at that head table included **Barry Thompson**, **Srini Vasan** and **Mark Siegel** of Tandy, **Marty Goodman**, **Dale Puckett**, **Richard White**, **Rick Adams** and **Lawrence C. Falk**, a.k.a. "Lonnie." As coffee was making its second round through the room, Dick White stood up to speak on the CoCo's coming of age.

White was up-front with the objectives of his speech: "I want to talk long enough so that Lonnie won't feel the need to lead a sing-along." (White was successful in this.) Putting the jokes aside, White — his glasses perched at that impossible angle on his forehead, as usual — dove into the subject at hand: where the Color Computer has been and where it is going.

He reminisced about the good old days back in 1981 when upgrading to 16K from 4K cost $124, when there was no problem with piracy "because there was nothing to pirate." Concluding with praise for the possibilities OS-9 Level II has opened, Dick White proclaimed 1988 the year of the hard drive.

Premiere Performances

What was new at the show? Quite a lot, thank you. Nearly every booth featured a new utility or game.

Manohar Santwani of **Microcom Software** sold out of his new *Color Schematic Designer*. A newcomer to the 'fest, **Game Point Software** drew in crowds with two new games, *Rupert Rhythm* and *Space Intruders*.

Rulaford Research's **Cecil Houk**, his CoCo and six of his scintillating synths were on hand to entertain 'fest goers. He sold his new program for the FB-01 sound generator, *FB01Calc*, in addition to *Lyra* and *Lyra Lybrary*.

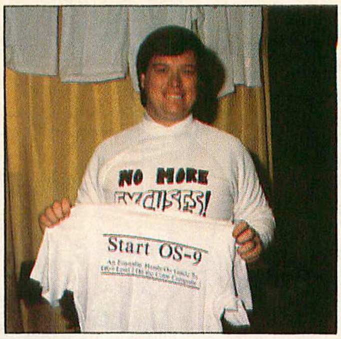
Art Flexser of **SpectroSystems** demoed *Extended ADOS3*, which gives users point-and-click program selection, two RAM disks and access to six physical drives.

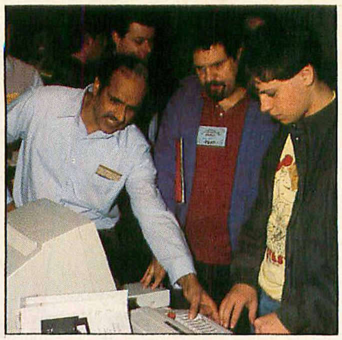
New items at the **Frank Hogg Laboratories** booth included the Eliminator all-in-one card (hard and floppy drive interfaces, a clock, two serial ports and one parallel) and a prototype of a 68000, OS-9-capable system.

Tom Roginski and **Owl-Ware** introduced three new products: a version of BASIC for hard drives, a word processor (*Window Writer*) and a programmable interface that connects an IBM keyboard to a CoCo. Also for sale was *DaVinci3*, Owl-Ware's entry into the CoCo 3 graphics market.

Jon Gilbert of **Delphi** and programmer **Rick Adams** demonstrated two new programs that will soon be available in the CoCo SIG on Delphi: *Flip-It* (an online "Othello") and *DelphiTerm*, an enhanced version of *Rickeyterm* featuring graphics, one-key logon and a larger buffer.

Chris Rochon and **Tony DiStefano** were on hand to premiere **C.R.C./Disto**'s new three-in-one board, which holds parallel and serial ports and a battery-backed, real-time clock. Also at the C.R.C. booth were the four-in-one (adds a hard disk adapter) and the inexpensive "mini controller."





At left, David Esleck of Kenneth-Leigh Enterprises: This man means business! Microcom's Manohar Santwani, at right, demoes *Color Schematic Designer* to Martin Spiller and his son, Jeremy, who is a frequent RAINBOW contributor.

Ross Litton of **Howard Medical** introduced PC-ROM, a chip he says "replaces CoCo 3's BASIC ROM, allowing boot-ups with pictures of yourself, which we digitize."

Chris and **Trisha Burke** of **Burke & Burke** have come up with a multi-user word game for OS-9 called *Pert-ASCII*. The big seller at the booth, however, was *R.S.B.*, which simulates Disk BASIC in OS-9.

The new "CoCo Crazy" CoCo Cat T-shirt, sold at the **Mercer County CoCo Club** booth, proved to be popular. Thanks again, Mercer County!

The Public Domain Software Copying Company offered a new six-disk set of public domain programs from Australia.

At the RAINBOW booth there was brisk trade in *The Fourth Rainbow Book of Adventures*.

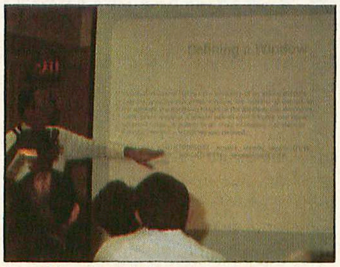
A quick hug before the show.

OS-9 Out in Force

At the **OS-9 User's Group** booth, **Bill Brady** and **Mark Griffith** were on hand to sell memberships and Brady's shareware program *The Wiz Professional* — a much-praised telecommunications program. Brady tends to be wittily modest about his work: "Somebody called me a third-rate programmer — I'm a fifth-rate programmer."

Granite Computer Systems sold *GCS File Transfer*, a program that converts files among Disk BASIC, FLEX, OS-9 and MS-DOS formats.

Paul Ward and **David Esleck** of **Kenneth-Leigh** Enterprises cracked up the show with their "No more excuses! Start OS-9" T-shirts. They also were selling copies of their user-friendly new book, *Start OS-9: An Enjoyable Hands-On Guide to OS-9 on the Color Computer 3*. Ward claims that the book sports the world's longest subtitle.



In his BASIC09 seminar, Dale Puckett "performs an event."

Gossip, Gossip, Gossip

You heard right! There was free food and refreshments for Delphi members at **Delphi Saturday Night**, a little bash Delphi put together so that online friends could meet each other offline ("in real time <grin>").

Steve Bjork took time off from his honeymoon to come to RAINBOWfest and lead a much-appreciated seminar. Thanks, Mr. and Mrs. B., and congratulations!

Unfortunately, not everybody made it to the 'fest; three Falsoft personnel were struck down by vicious viruses— including RAINBOW's managing editor, **Jutta Kapfhammer** — and a fourth broke a finger.

Jim Wald and **Robert Warner** of **Micro Master** said they had luck selling "generic" stuff, like external modems. The most distinguishing feature of their booth, however, was an *MS-DOS machine* displaying VGA graphics. "We're the heretics," Jim said, laughing.

Speaking of radical, was that a (gasp!) MS-DOS computer at the **Owl-Ware** booth displaying digitized *Star Trek* pictures? Say it ain't so.

If you happened to mosey past the **Public Domain** booth, pal, you could have met **Don Johnson**, live and in person. *Really*.

Howard C. Rouse wins the "Most Prolific Artist" award for entering 18 pictures in CoCo Gallery Live. He also wins second and third places for entries "Seaside City" and "Red Sails." First prize went to **Lori Dies** for "Evil Unleashed." First prize in the CoCo 1 and 2 category went to **Randy Adams** for "Pyramids." Honorable mentions were awarded to **Logan Ward** for "The King" and to **Tracy Lammardo** for her entry, "Bit Bucket."

If you're ever at a 'fest and see **Marty Goodman**'s wooden CoCo at the Delphi booth, don't ask **Paul Hodosh**, because he doesn't know a thing about it.

Manohar Santwani said of the current version of **Microcom**'s word processor, "*WordPower 3.2* is selling like hotcakes." With more sequels than the *Rocky* flicks, *WordPower* is yet again in the process of revision. But, hey, we're not complaining!

Frank Hogg deserves the "Euphemism With Tongue in Cheek" award for his sign describing the wonderful, spectacular, "optical-to-digital transfer method for setting the computer's time" — LCD stick-on clocks!

Joe Huber, assistant to **Bill Vergona** of **Cer-Comp**, lost his voice — presumably from answering questions about the company's new programming environment, *Window Master*. If you attended the 'fest and were left with questions about this program unanswered due to "technical difficulties," turn to the reviews section of this issue.

Offline conferencing with Jon Gilbert, Rick Adams, Marty Goodman and Paul Hodosh.

MICRO MASTER

At left, Robert Warner and Jim Waid, the "heretics" of Micro Master. At right, brother and sister have a little family argument over who gets to carry the new CoCo 3 home.

To be a good space pilot, you need a lot of advance training. This youngster logs in some light years with *Silpheed,* a space fighter simulation from Tandy.

Fun and Games

At **Gimmesoft, Tom DiMarco** and son had a demo of *MaxSound* running creepy dialogue from the movie *The War of the Worlds.* Gimmesoft played host to **Glen Dahlgren** of **Sundog Systems**, providing a setup for Sundog's hot new game,*Warrior King*.

Diecom was on hand with its new phaser game, *Medieval Madness.* At **Game Point**, *Mine Rescue*, *Warp Fighter 3-D* and *Bash* were selling well. **MichTron** had a few of the older (pre CoCo 3) games for sale, including *Speed Racer* and *Outhouse*.

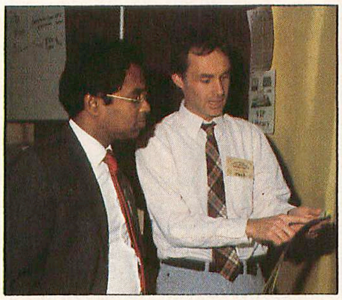
Steve Blyn and **Computer Island** filled a niche with their educational programs and the booth's best seller, *CoCo 3 Wheel of Fortune*.

Desktop Publishing

Second City Software attended the 'fest with exclusive rights to *The Newspaper Plus*, which was sold for $39.95.

John Monin and **Colorware** were doing a brisk business with *Max-10*, a WYSIWYG word processor that, when combined with *CoCo Max III*, gives CoCoists desktop publishing powers. Colorware sold a package of 30 new *Max-10* fonts (in sizes from 6 to 24 points) for $29.95 — "That's 75 cents a font," added Monin.

Zebra Software's booth had a packed house with *Graphics Designer Plus*, a printer-oriented WYSIWYG program that prints banners and signs. It includes an onscreen preview.



Srini Vasan, left, software buyer for Tandy, talks to Ed Hathaway of Second City Software.

CoCo 101 Through 599

Class was in session at RAINBOWfest as 14 CoCo specialists convened to hold seminars on topics of interest to beginning, intermediate and advanced CoCoists. Many of the discussions were standing-room-only.

Rick Adams, author of *Rickeyterm* and *Shanghai*, talked to beginning assembly language programmers about the CoCo 3's hardware, focusing on the GIME chip. **Steve Bjork**, programmer of *Pitfall II* and *Warp Fighter 3-D*, gave advice to a full house on writing game software. For would-be assembly programmers he offered this advice: "Learn on the Z80, 6809 or 6502." **Nancy Ewart** conducted a session for those interested in learning to program in C.

It was a packed house at the impromptu "Talking to Tandy" seminar, which was led by **Mark Siegel**, senior engineer, **Barry Thompson**, buyer for the Color Computer, and **Srini Vasan**, buyer for software.

Dale Puckett gave two seminars — "Overview of OS-9" and "Overview of BASIC09" — using parts of his *KISSDraw* code as examples. **Marty Goodman** and his famous T-shirt provided CoConuts with another doubleheader — two presentations of his "CoCo Consultations Live" seminar, complete with surprise guests (Steve Bjork and Rick Adams). Besides answering technical questions, Marty posed one of his own: "Does anyone know the plural of 'Olympus'?" RAINBOW's **Cray Augsburg** led two sessions of "OS-9 for Absolute Beginners," focusing on OS-9's directory structure.

Paul Hodosh, Delphi's marketing manager, talked on the development of Delphi and of online services in general. **Cecil Houk** of **Rulaford Research** took a break from entertaining to give a seminar on music, MIDI and the CoCo.

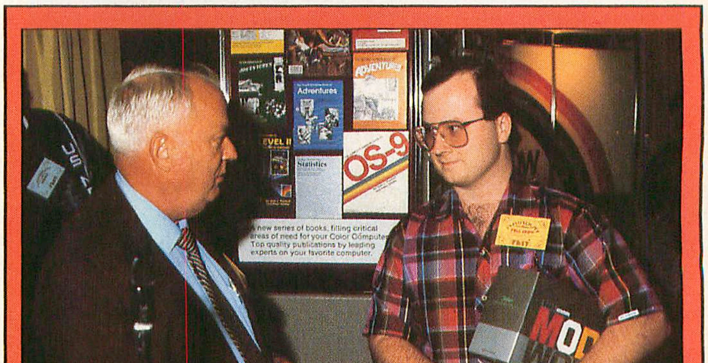
Ed Samuels, a professor at New York Law School, talked on ramifications of the new copyright law on commercial and public domain programs. Under the new law, you don't have to put copyright notices on a program, because anything distributed has an assumed copyright. "In essence, this blanks out the public domain," he said.

Chris Burke of **Burke & Burke** led a popular, informative, two-hour-long seminar on hard drives. In addition to describing how to add a hard drive to a CoCo setup, Burke discussed optical storage devices and high-density floppy drives. **Logan Ward**, who writes and illustrates RAINBOW's CoCo Cat and Maxwell Mouse comic strips, demonstrated creative uses for *CoCo Max* — making calendars, cards, certificates, comic strips and brochures. Also, he served as "curator" of CoCo Gallery Live. Thanks, Logan!

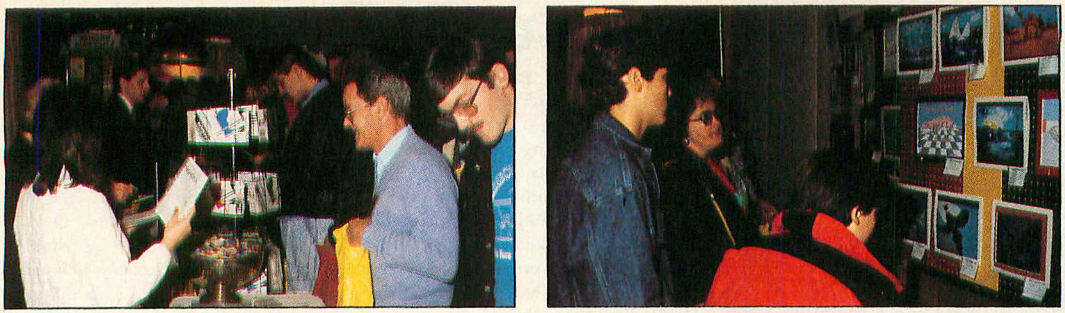
Bruce Bell, a two-time winner of the RAINBOW Adventure Contest, conducted a seminar on writing both graphics and text-only Adventure games for CoCos 1, 2 and 3.

Ben Burnette and **Wayne Smith** of **CY-BURNET-ICS**, both elementary school principals, discussed computers as pertaining to educators, touching on networking, word processing and office management.

Cecil Houk of Rulaford Research: Master of the Synths.



George Beggs of Tallyn Communications congratulates the lucky winner of a 2400-baud modem raffle.



At left, six years of Color Computer history on sale at the RAINBOW booth. At right, discriminating art connoisseurs check out the CoCo Gallery Live exhibition.

Saying Hello to Good Buys

If RAINBOWfest could be considered a thermometer of the CoCo climate, we would see that the Community has developed a fever for three things: hard drives, 2400-baud modems and desktop publishing software. Vendors carrying these types of items soon found themselves swamped.

There was a little friendly competition for the microphone — announcing a drawing at one's booth became the thing to do. Items given away included modems and T-shirts. But 'fest goers didn't have to wait for a raffle to take advantage of some good deals.

Microworld and **Microworld II** soon sold out of *Shanghai* at its $5.99 price; CoCo 3s went for $115. Also selling CoCo 3s for $115 was **Fran Purcell** of **Computer Plus**, who sold 80. At that booth, Tandy educational software went for $5. **Frank Hogg** sold *Sculptor* at a 'fest price of $120.

Barry Thompson, buyer for Tandy, caught in clinch with CoCo Cat (it's true love).

Don Johnson and **Robert Vervoordt** of **Public Domain Software Copying Company** were selling 600 public domain programs on 42 disks for the CoCo 2 and 3. If you bought the whole library, they threw in a plastic bucket (red, yellow or orange): "You can store about 100 disks in it," Vervoordt said. In a brilliant stroke of marketing, they advertised the buckets as $19.95 each — or free with a $10 purchase. Funny fellows.

2400-baud modems were hot commodities at the show, and they could be purchased for as low as $169 (Microcom price). By Saturday night, **Frank Hogg** had sold out of his $150, speed-upgradable 1200-baud modems, on which he offers a five-year warranty. For a limited time, the people at the **Delphi** booth were selling *DELPHI: The Official Guide* and one hour of connect time for $14.95.

Richard and **Sharlie Gros** of **Performance Peripherals** were selling the dual-mode No-Halt DMC controller — "which reads a diskette in one revolution as opposed to three" — for $99.

Ross Litton of **Howard Medical** did a brisk trade in monitors and disk drives. A double-sided Drive 0 package with controller went for $178.45. Litton said his best seller was a Magnavox 8CM515 monitor.

Zebra Software drew ceaseless crowds with Wico trackballs, 300-baud modems for $29.95 and copies of *The Graphics Designer Plus* at a RAINBOWfest special price of $24.95.

For those with T-shirts, printers — or crayons — and imaginations, **Foto-Wear** offered "Print 'n Wear" iron-on T-shirt transfers.

Bill Vergona of **Cer-Comp** had a 512K CoCo 3 set up with *WindowMaster*, an environment that lets CoCo programmers take advantage of windows *without* OS-9. Also featured at the Cer-Comp booth was *TextPro IV*, a WYSIWYG word processor.

Lonnie, himself, has been known, on occasion, to commandeer the microphone and announce immediate "five-minute specials" on certain RAINBOW Bookshelf items. But don't tell anybody!

The Hard Drive Phenomenon

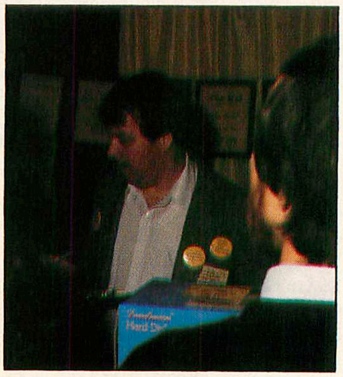
For the first few hours of the 'fest, there were hard drives everywhere you looked. Then you blinked, and they were gone. Investigation into this matter revealed an inverse relationship in the price of hard drives to the number of hard drives purchased (1/$=HD). Falling prices have truly made 1988 — and 1989 — the years of the hard drive.

Howard Medical offered a 20-Meg Seagate hard drive package for $495 — this included a Western Digital controller and a Burke & Burke interface. "All you have to do is plug it in and it's ready to drive," said **Ross Litton.**

Frank Hogg did well selling the "Cadillac of hard drives," as he called it. "We sold out in two hours." **Kevin Franciotti** of **Hard Drive Specialist** sold out of 30-Meg hard drive kits Friday night.

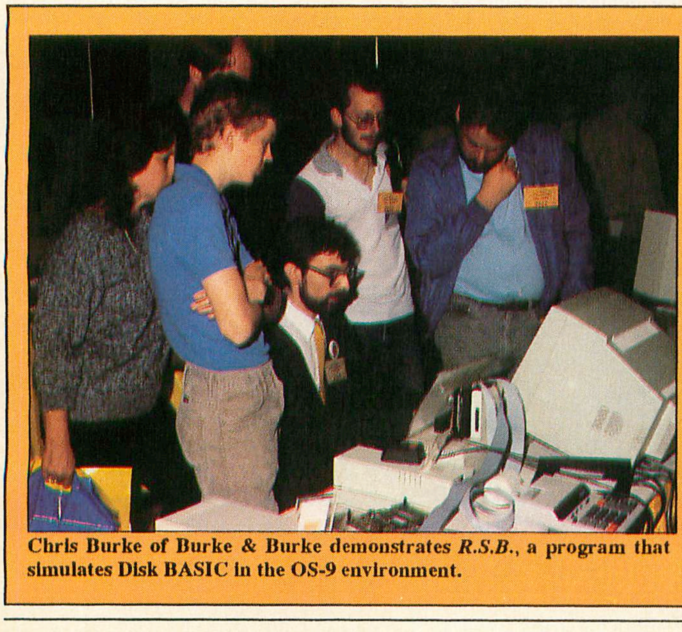
Arizona Small Computers' James Blandon reported selling 14 hard drive kits. Blandon offers hard drives starting at $120 for 5-Meg kits — you supply the case and the interface. He offers a "club special" of $350 for complete 20-Meg systems.

Hard drive interfaces were popular, as well. **Trisha Burke** of **Burke & Burke** said that she and husband **Chris** had sold out of almost all their interfaces. **C.R.C./Disto** was also a popular source for interfaces.



Frank Hogg holds a little hard drive seminar of his own.

Lonnie Falk and Gordon Monnier of MichTron.



Chris Burke of Burke & Burke demonstrates *R.S.B.*, a program that simulates Disk BASIC in the OS-9 environment.

What's Next?

Vendors talked excitedly about new projects in the works, dropping tantalizing hints, but most would retreat to hasty "no comments" when pressed for more information. "If I didn't have any competitors...." was the stock response.

Most were like **Gimmesoft's Tom DiMarco, Sr.**, who said he had two — maybe four — projects in development, but would not reveal any more than that. (DiMarco did, however, say that they would be ready by the Chicago 'fest in April.)

Considering all the hints, "no comments" and off-the-record appetizers, the next 'fest looks to be a feast.

See you in Chicago!

Increase students' memorization abilities

The Blink of an Eye

By Steve Blyn
Rainbow Contributing Editor

A tachistoscope is an apparatus that exposes visual stimuli (words, symbols, pictures, etc.) for a brief period of time.This device regulates the exposure time by an interruption of light, dropping a screen, closing a camera shutter, and so on. The tachistoscope was first used by experimental psychologists for experiments involving visual perception. A number of more famous experiments involved the effect of visual *suggestions* transmitted by the tachistoscope on the persons being tested.

Later, the tachistoscope was used in the study of learning, attention and perception. We have found this device especially helpful for teaching students spelling words. This month's program, *Tachistoscope*, creates a computer version of this device.

Our program gives students an opportunity to study their weekly spelling lists independently and in a new way. Users will first be asked to enter their spelling words and conclude the list by entering `END`. This final statement signals the computer that the word list is complete. Students may enter any number of words up to 50 for this exercise. Sometimes review tests and midterm exams contain more than 50 words. If you need to increase this total, change the `DIM` statement in Line 30.

Once students have entered their word lists, the program asks them to select the appropriate speed. The number requested represents the approximate time in seconds that each word should be displayed. One second is a good place to begin, but some fraction of a second is more realistic for middle-school students. Fractions of a second should be entered as decimals. For example, one-half second would be identified as .5. (One-half second is a good speed for middle-school students who are completing last-minute reviews the day before an examination.)

At first younger or slower children should practice at much slower speeds (two, three or even four seconds) to guarantee positive results and to avoid frustration. We would not want to have any student give up without giving the program a chance. Students' speeds can be built up gradually before any testing takes place.

For students who want or need additional challenge, we have included the option of displaying only the first part of each word. Line 110 of the program asks whether students want to see all or part of the words. If A is pressed, the program will begin, and an entire word will be selected at random and displayed for the chosen amount of time. If P is selected, the program then asks for the number of letters to be displayed for each word. Once the user has identified this total, the program continues in the same manner as described earlier.

The Part option is useful for students who memorize words easily and need only brief exposure to them. This option encourages students to master the complete spelling of all the words and can be used as a game to see how few letters need to be shown to guess the word and spell it correctly. Line 160 lets the student choose between two and five letters for this option. We felt this would be practical in most situations, but it should be altered if your students will be spelling longer words.

After the word has been displayed, the student is asked to spell it. The program then identifies whether or not the answer is correct. If the spelling is incorrect, the program displays the correct spelling next to the student's response for comparison. To proceed to the next word, the student must press `ENTER`. To end the session, the student may press E.

This program is not limited to spelling. You may use or alter the program for history exams, multiplication tables — anything that requires memorization. We at Computer Island would be delighted to hear from anyone who comes up with applications for this program other than spelling. Enjoy the program, and we'll see you next month. □

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The Listing: `TACHISTO`

```
10 REM"TACHISTOSCOPE"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1989"
30 DIM A$(50)
40 CLS5:N=1:C$=STRING$(28," ")
50 PRINT@0,"":PRINT@0,"ENTER WOR
D #";N;:INPUT A$(N)
60 SOUND 200,2:IF A$(N)="END" TH
EN PRINT@0," ":PLAY"L2A":GOTO 90
70 N=N+1
80 GOTO  50
90 PRINT@0," ":PRINT@0,"ENTER SP
EED IN SECONDS";:INPUT S
100 SOUND150,2:IF S<0 OR S>10 TH
EN 90
110 PRINT@0,"DO YOU WANT TO SEE
 aLL OR pART  OF THE WORDS ";
120 LINEINPUT Q$
130 IF Q$="A" THEN 170 ELSE IF Q
$="P" THEN 140 ELSE 110
140 PRINT@0,"HOW MANY LETTERS OF
 EACH WORD   WOULD YOU LIKE TO S
HOW ";
150 INPUT Q
160 IF Q<2 OR Q>5 THEN SOUND 10,
4:GOTO 140
170 PRINT@0,"*****      TACHISTOS
COPE    *****"
180 FOR T=1152 TO 1183:POKE T,12
8:NEXT T:FOR T=1312 TO 1343:POKE
 T,128:NEXT T
190 POKE1184,128:POKE1185,128:PO
KE1216,128:POKE1217,128:POKE1248
,128:POKE1249,128:POKE1280,128:P
OKE1281,128
200 POKE1215,128:POKE1214,128:PO
KE1247,128:POKE1246,128:POKE1279
,128:POKE1278,128:POKE1311,128:P
OKE1310,128
210 R=RND(N-1):TIMER=0:PRINT@194
,C$;:PRINT@226,C$;
220 IF Q$="A" THEN Q=LEN(A$(R))
230 PRINT@204,LEFT$(A$(R),Q);
240 IF TIMER>60*S THEN 250 ELSE
230
250 SOUND240,1:PRINT@194,C$;:PRI
NT@202,"? ";
260 LINEINPUT B$
270 POKE 1247,128:POKE 1246,128
280 IF B$=A$(R) THEN PRINT@236,"
CORRECT";:PLAY"L200CDECDECDEGGG"
290 IF B$<>A$(R) THEN PLAY"D-":P
RINT@232,"SORRY, "A$(R);
300 EN$=INKEY$
310 IF EN$=CHR$(13) THEN 210 ELS
E IF EN$="E" THEN 320 ELSE 300
320 CLS:END
```

If you never seem to have enough time, use this program to organize your schedule

I'm Late! I'm Late!

By Mary and James Lamonica

Life is complicated. We are bombarded by a multitude of commitments, and every day we are asked to fit just "one more thing" into our busy schedules. Requests come from friends, relatives and coworkers. While at work we are expected to remember meetings, deadlines and appointments, at home we must keep track of everything from bills to birthdays. In our spare moments, we promise to get together with friends and "do lunch." How can we keep track of all these plans? More important, how can we ease the stress that such schedules can produce?

Organizing our plans can relieve part of the burden. If we have a list of the day's events, we are less likely to forget plans and commitments. We are also less likely to overburden ourselves if we can refer to an itinerary before making additional plans. The ability to see a layout of the day can help us set more realistic goals for ourselves.

Daily Planner helps us organize our scheduled lesson plans for our classes in a less stressful — more productive — manner. You can use the program to better plan your own schedule as well. The program will accept a list of 10 items for each day of the week. You can organize this list in a number of ways. If you have many appointments and commitments, you may want to list the day's events chronologically — including the time and place for each meeting or commitment. If, however, your time is flexible but the number of responsibilities is great, you can list the day's duties by order of importance.

Several variables are used in the program. The following table will help you better understand the options available and help you modify the program as necessary.

Variable	Description
D$	A two-dimensional array for the day of the week and the items for that day.
H$	A one-dimensional array for the printed headlines.
I$	Used for all INKEY$ statements.
KL$	Used for the filename in the KILL FILE function.
F$	Used for the filename in the SAVE and LOAD functions.
R$	Used for the days of the week stored in the DATA line.
DW$	Same as R$.
L$	The LEFT$ of D$.
M$	The MID$ of D$.
DM$	The MID$ of D$, used to find a blank space.
Z	Used to count the length of D$.
LE	Same as Z.
X, Y, P and H	Used as general counters.

Table 1: Program Variables

As written, *Daily Planner* requires a Color Computer with 32K ECB and a disk drive. However, the program will run on a cassette-based system if the following lines are substituted for those in the listing:

```
34 CLS:PRINT"":PRINTTAB(10) "CSAVE DATA"
35 OPEN"O",#-1, "PLANDATA"
38 PRINT#-1,D$(X,Y)
41 CLOSE#-1
44 CLS:PRINT"":PRINTTAB(10) "CLOAD DATA"
45 OPEN"I",#-1, "PLANDATA"
48 INPUT#-1,D$(X,Y)
51 CLOSE#-1
```

At the opening screen, *Daily Planner* offers you eight options, each chosen by selecting its corresponding number. The first option takes you to a Data Entry menu. From that menu, choose the appropriate day of the week and enter up to 10 items — appointments, plans or reminders — for that day. The LINE-INPUT command is used, so you can include appropriate punctuation. Each item can be up to 140 characters long. If you exceed the character limit, the program will ask you to re-enter the line. When you finish an item, press Q to return to the Data menu. If you have made a mistake, press the up arrow and ENTER. This will return you to the last item you entered.

Options 2 and 3 let you save and load schedules from disk, respectively. The Save option lets you choose the filename for each schedule. The program attaches the extension /DAT to your

The Lamonicas live in El Paso, Texas, where Mary teaches algebra and consumer math at Irvin High and James teaches social studies at Henderson Middle School.

XTEAM & OS-9

XTERM

OS-9 Communications program

- Menu oriented
- Upload/download Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 Pak, or PBJ 2SP Pack, Includes all drivers
- Works with standard screen, Xscreen WORDPAK or DISTO 80 column board

$49.95 with source **$89.95**

ECONOMIST

Perform economic analysis to compare different cost and income alternatives! Compute present and future Life Cycle Worths for various combinations of single, series and gradient dollar amounts. Quickly edit and recompute for sensitivity analysis! Display line graphs. Printout data and results. Pull-down menus, windows and prompts. Requires os-9 level II and Basic09.

$39.95 WITH SOURCE $79.95

HARDWARE

512k memory upgrade	$134.95
Ram Software Ram Disk Print Spooler Quick Backup	All three for only $19.95

*Software by ColorVenture

XWORD

OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or DISTO
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE Mail merge capabilities for XWORD

$24.95 with source **$49.95**

XSPELL OS-9 spelling checker, with 40000 word dictionaries

$39.95

XTRIO XWORD/XMERGE/XSPELL

$114.95 with source **$199.95**

XED OS-9 full screen editor

$39.95 with source **$79.95**

XDIS OS-9 disassembler

$34.95 with source **$54.95**

XDIR & XCAL Hierarchial directory, OS-9 calculator

$24.95 with source **$49.95**

THE DIRECTOR

Produces hires picture sound and color animation shows. Completely menu driven with full editing. Great for presentations and vcr's. Requires COCO III only.

$39.95

Call for package price

AND FOR RS DOS ...

SMALL BUSINESS ACCOUTING

This sales-based accounting package is designed for the non-accountant oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vender status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List.

$79.95

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory.

$59.95

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Aditional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware

$59.95

PERSONAL BOOKKEEPING 2000

Handles 45 accounts. Enters cash expenses as easily as checks. Handles 26 expense categoriesK. Menu driven and user friendly.

$39.95

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, perpares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accting package.

$59.95

ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

$59.95

MICROTECH CONSULTANTS INC.

1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

VISA MasterCard

Ordering Information

Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $3.50), personal checks.

(612) 633-6161

filename, so you don't need to include an extension when saving a file to or loading a file from disk. In addition, you don't need to remember filenames when retrieving a data file. The Load function lists the disk directory for you.

The fourth option, the Print function, is the heart of the program. When you indicate that you are ready to print a file, the computer will ask for a four-line heading. Once you have entered that information, the computer will begin printing. Line 56 includes special printer codes for a DMP-110 printer. The code `(27)` and `(17)` tells the DMP-110 to print with proportional elite type. You must change this code to fit your printer or delete the code. In addition, Line 68 includes the printer code `(12)`. This code is almost universal for advancing the paper. However, you should check your printer manual and delete the code if necessary.

The Print function includes a word-wrap routine. Variable `Z` is the maximum line length. Variable `LE` is the item length. If `LE` is greater than `Z`, the program begins a routine that will end the line as close to 70 characters as possible without breaking a word.

The program will print all items saved for each day. If it determines that nothing has been saved in an item string, the program will advance three lines and then move to the next day of the week. When the program completes the items for Friday, the program ends. Use the eighth function to advance the paper to remove your week's schedule.

Finally, two options are offered for clearing data. The sixth function clears a file from your disk. On the other hand, the seventh function clears the screen and then erases the program from memory. Make sure you're ready to quit before you choose Option 7.

If you are like us, no day's schedule is carved in stone. We edit our lists several times before the week begins, and we generally edit them more during the week. We try to keep a copy of our week's schedules with us at home and at work. We refer to the copy when making or changing any plans, and we add these changes to the week's file in the evening. We like to start the day with a clean copy of our schedules. After all, an organized list is a good step toward an organized week.

Our lives are complicated, but that does not mean that they should be disorganized and stressful. We hope that *Daily Planner* can help you plan your busy schedule in a positive way.

(Questions and comments may be directed to the authors at 10456 Orpheus Drive, El Paso, TX 79924. Please include an SASE when requesting a reply.) □

17 33
34 15
58 136
END 231

The Listing: `DAYPLAN`

```
1 DIMD$(5,10):CLEAR7000
2 DIMH$(5)
3 CLS:PRINT"":PRINTTAB(10)"(1) E
NTER DATA"
4 PRINTTAB(10)"(2) SAVE DATA":PR
INTTAB(10)"(3) LOAD DATA":PRINTT
AB(10)"(4) PRINT DATA":PRINTTAB(
10)"(5) KILL FILE":PRINTTAB(10)"
(6) CLEAR MEMORY":PRINTTAB(10)"(
7) QUIT":PRINTTAB(10)"(8) ADVANC
E PAPER"
5 I$=INKEY$:IFVAL(I$)<1ORVAL(I$)
>8THEN5
6 IFVAL(I$)=7THENCLS:NEW
7 ONVAL(I$)GOSUB15,33,43,53,9,75
,,78
8 GOTO3
9 CLS:PRINTTAB(10)"KILL FILE":DI
R:PRINTTAB(10)"ENTER FILE NAME":
PRINTTAB(10)"";:INPUTKL$
10 PRINT"":PRINT"":PRINTTAB(5)"A
RE YOU SURE (Y/N)"
11 I$=INKEY$
12 IF I$="N" THEN RETURN
13 IF I$="Y" THEN KILLKL$+"/DAT"
:RETURN
14 GOTO11
15 REM  ENTER DATA
16 CLS:PRINT"FILE=";F$:PRINT"":P
RINT""
17 PRINT"":PRINTTAB(10)"(1) MOND
AY":PRINTTAB(10)"(2) TUESDAY":PR
INTTAB(10)"(3) WEDNESDAY":PRINTT
AB(10)"(4) THURSDAY":PRINTTAB(10
)"(5) FRIDAY":PRINTTAB(10)"(6) R
ETURN"
18 I$=INKEY$:IFVAL(I$)<1ORVAL(I$
)>6THEN18
19 IFVAL(I$)=6THENRETURN
20 X=VAL(I$)
21 CLS:PRINT"FILE=";F$:PRINT"":P
RINT""
22 PRINTTAB(10)"PRESS Q TO QUIT"
:PRINTTAB(10)"ENTER DATA FOR"
23 FORR=1TOX:READR$:NEXTR
24 PRINTTAB(13)R$
25 FORY=1TO10
26 IFLEN(D$(X,Y))>1THENPRINTY;"-
";D$(X,Y):GOTO31
27 PRINTY;"-";:LINEINPUTD$(X,Y)
28 IFLEN(D$(X,Y))>140THENPRINT"E
NTRY EXCEEDS LIMIT":GOTO27
29 IFD$(X,Y)="Q"THEN32
30 IFD$(X,Y)="^"THENY=Y-1:GOTO27
31 NEXTY
32 RESTORE:GOTO15
33 REM SAVE DATA
34 CLS:PRINT"":PRINTTAB(10)"SAVE
 DATA":PRINTTAB(10)"ENTER FILE N
AME BELOW":PRINTTAB(10)"";:INPUT
F$
35 OPEN"O",#1,F$+"/DAT"
36 FORX=1TO5
```

```
37 FORY=1TO10
38 WRITE#1,D$(X,Y)
39 NEXTY
40 NEXTX
41 CLOSE#1
42 RETURN
43 REM LOAD DATA
44 CLS:PRINT"":PRINTTAB(10)"LOAD
 DATA":DIR:PRINTTAB(10)"ENTER FI
LE NAME BELOW":PRINTTAB(10);:INP
UTF$
45 OPEN"I",#1,F$+"/DAT"
46 FORX=1TO5
47 FORY=1TO10
48 INPUT#1,D$(X,Y)
49 NEXTY
50 NEXTX
51 CLOSE#1
52 RETURN
53 REM PRINT DATA
54 CLS:PRINT@64,"ENTER 4 LINE HE
ADING BELOW"
55 PRINT"":FORH=1TO4:PRINTH;"-";
:INPUTH$(H):NEXTH
56 PRINT"":PRINT"":PRINT"WORKING
 TO PRINT OUT YOUR DATA!":PRINT#
-2,CHR$(27)CHR$(17)
57 PRINT#-2,"":FORH=1TO4:PRINT#-
2,"              ";H$(H):NEXTH
58 PRINT#-2,"":PRINT#-2,""
59 FORX=1TO5
60 READDW$:PRINT#-2,"          ";DW$
61 FORY=1TO10
62 IFLEN(D$(X,Y))>70THENGOSUB69
63 IFLEN(D$(X,Y))<2THENGOTO67
64 IFLEN(D$(X,Y))>70THENPRINT#-2
,"            ";Y;L$:PRINT#-2,"
            ";M$:GOTO66
65 PRINT#-2,"              ";Y;D$(X
,Y)
66 NEXTY
67 FORP=1TO3:PRINT#-2,"":NEXTP
68 NEXTX:PRINT#-2,CHR$(12):CLOSE
1:RESTORE:RETURN
69 Z=70:LE=LEN(D$(X,Y)):Z=70
70 DM$=MID$(D$(X,Y),Z,1)
71 IFDM$=" "THENGOTO72ELSEZ=Z-1:
GOTO70
72 L$=LEFT$(D$(X,Y),Z):Z=Z+1:M$=
MID$(D$(X,Y),Z,LE)
73 RETURN
74 DATAMONDAY,TUESDAY,WEDNESDAY,
THURSDAY,FRIDAY
75 PRINTTAB(10)"CLEARING MEMORY"
76 FORX=1TO5:H$(X)="":FORY=1TO10
:D$(X,Y)="":NEXTY:NEXTX
77 F$="":RETURN
78 PRINT#-2,CHR$(12):RETURN
```

BYTE BACK AT TAXES WITH TRY-O-TAX

- available for CoCo, MSDOS, TRS-80
- revised for '88 law changes
- prompts for easy guided use
- calculates 1040, 1040A, 2441, 2106, 6502
- calculates schedules A-F, SE
- computer generated substitute forms
- FREE TAX ESTIMATE PROGRAM

PERSONAL CHECKS WELCOME
SHORT FORM ONLY $15.00
NO CREDIT CARDS, C.O.D.
$44.99 + 3.00 SHIPPING
TRY-O-BYTE, 1008 Alton Circle, Florence, S.C. 29501, (803) 662-9500

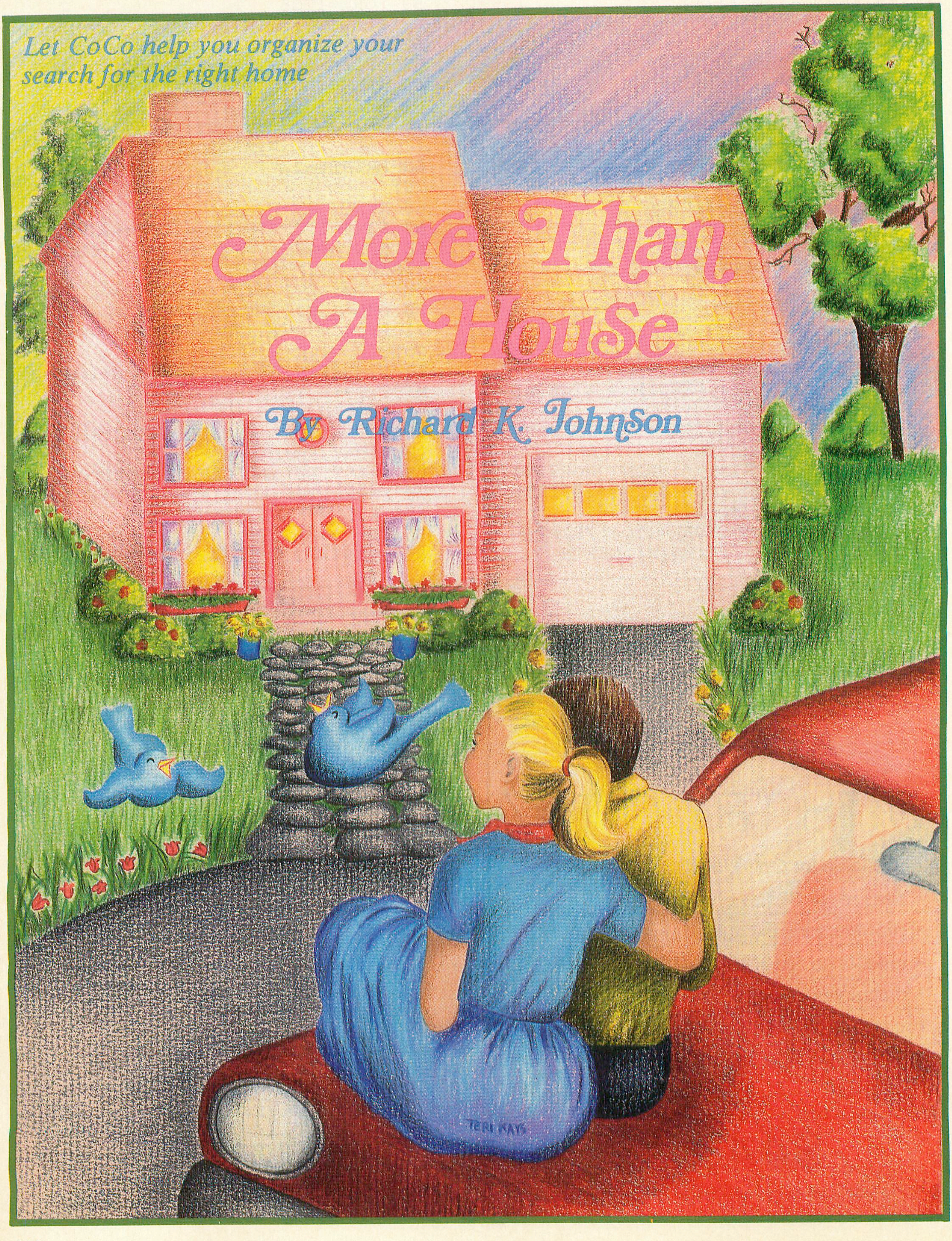
COMPUTER ISLAND EDUCATIONAL SOFTWARE

Tape or Disk

STREET MAP.............$19.95
KNOW YOUR STATES........ 19.95
FRENCH BASEBALL......... 19.95
SPANISH BASEBALL........ 19.95
HISTORY GAME............ 19.95
STATES AND CAPITALS..... 19.95
EXPLORERS AND SETTLERS.. 19.95
COMPUTER LITERACY....... 19.95

COMPUTER ISLAND
227 Hampton Green
Staten Island,NY 10312
(718) 948-2748

Add $1.00 postage, NY res. add tax
VISA, MC - Send for free catalog



More Than A House

By Richard K. Johnson

Let CoCo help you organize your search for the right home

Anyone who has ever purchased a house knows the excitement and the fear of house hunting. The decision to buy a house is an important step, but it's just the beginning. This purchase is probably the biggest investment you will make; you can't go into the purchase blind. There are a multitude of questions to be answered and decisions to be made. Is this a good neighborhood? How far is the house from work and school? Is the house in good repair? How much are its taxes? The list goes on and on. If this isn't enough to unsettle you, consider the number of houses that the average buyer must look at before this decision can be made.

True, house hunting is a formidable task, but don't despair. My programs, *Drive By* and *House*, can make your search easier (or at least a little more organized). The programs act as both a checklist of the many questions that must be asked and as a method of organizing and comparing the information about each house you consider. The programs require 16K ECB and can be used with either tape or disk systems.

The first step in buying a house is looking for one. You can look in the newspaper or in multiple listings (generally called *Homes* books), which are published by the Board of Realtors. These publications list all houses for sale in your area and give you basic information about the house.

Before contacting a realtor, most people like to ride by a house, making initial decisions about location and general conditions before hearing the sales pitch. My first program, *Drive By*, can help you make these preliminary observations. This program lists questions you can answer from your first inspection. The form does ask for some information not available at one glance. However, if you like the outside of the house and its location, you can use this form to guide your questions when talking to the realtor.

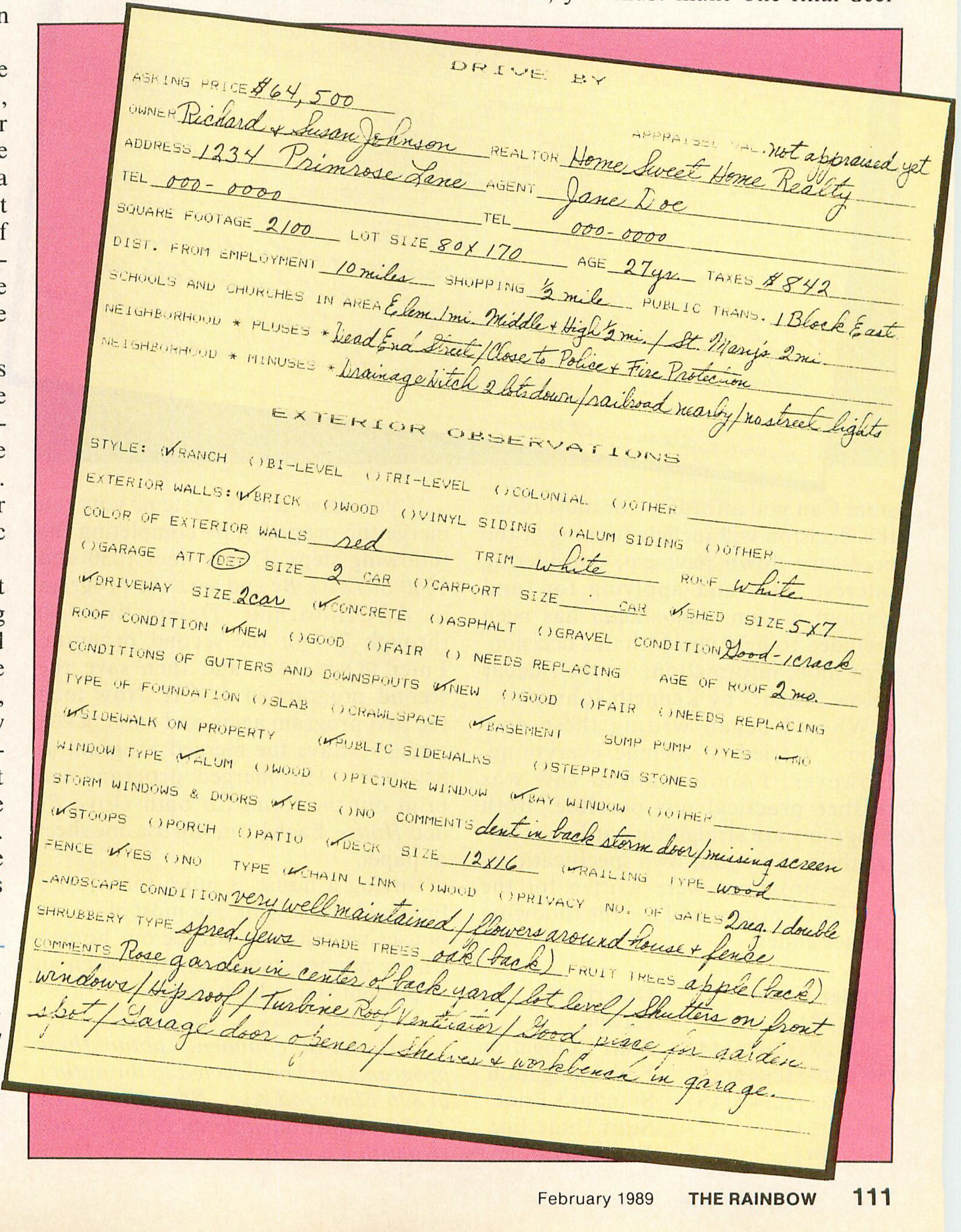
When you run *Drive By*, you are shown an opening graphics screen. After a few seconds, the program will prompt you to turn on your printer and prepare the paper. When you have done this, press ENTER. You will then be prompted for the number of copies you want (one to 10).

The second program, *House*, asks for information about the inside of the house like carpet color, size of water heater, appliances and their condition, and a basic description of each room. *House*'s form uses letters to denote certain qualities. The following is a list of these letters and their meanings:

Letter	**Definition**
E	Electric
G	Gas
O	Oil
S	Solar
WB	Wood-burning

I also included blank columns, so you can add features of importance to you (i.e., number of electrical outlets, fireplace, etc.).

Once you have found the perfect house, you must make one final deci-



DRIVE BY

ASKING PRICE $64,500

OWNER Richard + Susan Johnson

APPRAISAL VAL. not appraised yet

ADDRESS 1234 Primrose Lane

REALTOR Home Sweet Home Realty

TEL 000-0000

AGENT Jane Doe

SQUARE FOOTAGE 2100

TEL 000-0000

LOT SIZE 80X170

DIST. FROM EMPLOYMENT 10 miles

AGE 27yr.

TAXES $842

SCHOOLS AND CHURCHES IN AREA Elem. 1mi. Middle + High ½ mi. / St. Mary's 2mi.

SHOPPING ½ mile

PUBLIC TRANS. 1 Block East

NEIGHBORHOOD * PLUSES * Dead End Street / Close to Police + Fire Protection

NEIGHBORHOOD * MINUSES * Drainage Ditch 2 lots down / railroad nearby / no street lights

EXTERIOR OBSERVATIONS

STYLE: (✓)RANCH ()BI-LEVEL ()TRI-LEVEL ()COLONIAL ()OTHER

EXTERIOR WALLS: (✓)BRICK ()WOOD ()VINYL SIDING ()ALUM SIDING ()OTHER

COLOR OF EXTERIOR WALLS red

TRIM white

()GARAGE ATT/[✓ DET] SIZE 2 CAR

ROOF white

(✓)DRIVEWAY SIZE 2car (✓)CONCRETE ()ASPHALT ()GRAVEL

()CARPORT SIZE CAR

(✓)SHED SIZE 5X7

ROOF CONDITION (✓)NEW ()GOOD ()FAIR () NEEDS REPLACING

CONDITION Good - 1 crack

CONDITIONS OF GUTTERS AND DOWNSPOUTS (✓)NEW ()GOOD ()FAIR ()NEEDS REPLACING

AGE OF ROOF 2 mo.

TYPE OF FOUNDATION ()SLAB ()CRAWLSPACE (✓)BASEMENT

SUMP PUMP ()YES (✓)NO

(✓)SIDEWALK ON PROPERTY (✓)PUBLIC SIDEWALKS ()STEPPING STONES

WINDOW TYPE (✓)ALUM ()WOOD ()PICTURE WINDOW (✓)BAY WINDOW ()OTHER

STORM WINDOWS & DOORS (✓)YES ()NO

COMMENTS dent in back storm door / missing screen

(✓)STOOPS ()PORCH ()PATIO (✓)DECK SIZE 12X16 (✓)RAILING TYPE wood

FENCE (✓)YES ()NO TYPE (✓)CHAIN LINK ()WOOD ()PRIVACY NO. OF GATES 2 reg. 1 double

LANDSCAPE CONDITION very well maintained / flowers around house + fence

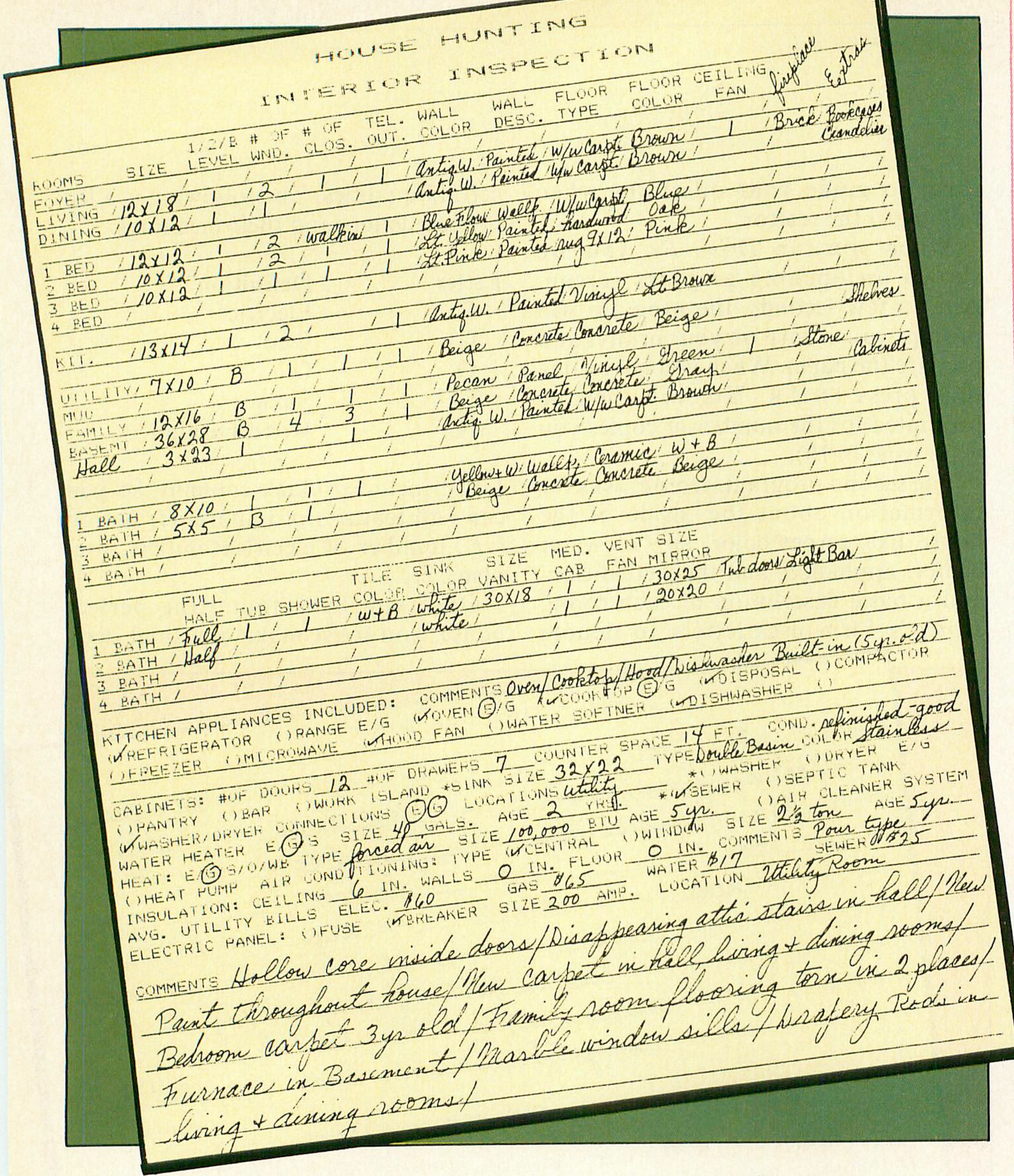
SHRUBBERY TYPE spred. yews

SHADE TREES oak (back)

FRUIT TREES apple (back)

COMMENTS Rose garden in center of back yard / lot level / Shutters on front windows / Hip roof / Turbine Roof Ventilator / Good place for garden spot / Garage door opener / Shelves + workbench in garage.

Richard Johnson is a machine operator at Corhart Refractories. He is married and has two children, Julie and Ricky. Richard has been writing programs for his CoCo 2 since 1985.



HOUSE HUNTING
INTERIOR INSPECTION

ROOMS	SIZE	1/2/B LEVEL	# OF WND.	# OF CLOS.	TEL. OUT.	WALL COLOR	WALL DESC.	FLOOR TYPE	FLOOR COLOR	CEILING FAN	fireplace	Extras
FOYER												
LIVING	12X18	1	2	1	1	Antiq.W.	Painted	W/w Carpt.	Brown	1	Brick	Bookcases Candelier
DINING	10X12	1	1			Antiq.W.	Painted	W/w Carpt.	Brown			
1 BED	12X12	1	2	walkin	1	Blue Flow	Wallp.	W/w Carpt.	Blue			
2 BED	10X12	1	2	1	1	Lt. Yellow	Painted	hardwood	Oak			
3 BED	10X12	1	1	1		Lt. Pink	Painted	rug 9X12	Pink			
4 BED												
KIT.	13X14	1	2		1	Antiq.W.	Painted	Vinyl	Lt Brown			
UTILITY	7X10	B	1	1	1	Beige	Concrete	Concrete	Beige			Shelves
MUD												
FAMILY	12X16	B	1	1	1	Pecan	Panel	Vinyl	Green	1	Stone	
BASEMT	36X28	B	4	3	1	Beige	Concrete	Concrete	Gray			Cabinets
Hall	3X23	1		1		Antiq. W.	Painted	W/w Carpt.	Brown			
1 BATH	8X10	1	1	1		Yellow+W.	Wallp.	Ceramic	W+B			
2 BATH	5X5	B	1			Beige	Concrete	Concrete	Beige			
3 BATH												
4 BATH												

	FULL HALF	TUB	SHOWER	TILE COLOR	SINK COLOR	SIZE VANITY	MED. CAB	VENT FAN	SIZE MIRROR	
1 BATH	Full	1	1	W+B	white	30X18	1	1	30X25	Tub doors Light Bar
2 BATH	Half				white		1	1	20X20	
3 BATH										
4 BATH										

KITCHEN APPLIANCES INCLUDED: COMMENTS Oven/Cooktop/Hood/Dishwasher Built-in (5yr. old)
(✓)REFRIGERATOR ( )RANGE E/G (✓)OVEN [✓ E]/G (✓)COOKTOP [✓ E]/G (✓)DISPOSAL ( )COMPACTOR
( )FREEZER ( )MICROWAVE (✓)HOOD FAN ( )WATER SOFTNER (✓)DISHWASHER ( )
CABINETS: #OF DOORS 12 #OF DRAWERS 7 COUNTER SPACE 14 FT. COND. refinished-good
( )PANTRY ( )BAR ( )WORK ISLAND *SINK SIZE 32X22 TYPE Double Basin COLOR Stainless
(✓)WASHER/DRYER CONNECTIONS [✓ E][✓ G] LOCATIONS utility *( )WASHER ( )DRYER E/G
WATER HEATER E [✓ G] S SIZE 40 GALS. AGE 2 YRS. *(✓)SEWER ( )SEPTIC TANK
HEAT: E/[✓ G] S/O/WB TYPE forced air SIZE 100,000 BTU AGE 5yr. ( )AIR CLEANER SYSTEM
( )HEAT PUMP AIR CONDITIONING: TYPE (✓)CENTRAL ( )WINDOW SIZE 2½ ton AGE 5yr.
INSULATION: CEILING 6 IN. WALLS 0 IN. FLOOR 0 IN. COMMENTS Pour type
AVG. UTILITY BILLS ELEC. $60 GAS $65 WATER $17 SEWER $25
ELECTRIC PANEL: ( )FUSE (✓)BREAKER SIZE 200 AMP. LOCATION Utility Room
COMMENTS Hollow core inside doors/Disappearing attic stairs in hall/New
Paint throughout house/New carpet in hall, living + dining rooms/
Bedroom carpet 3yr old/Family room flooring torn in 2 places/
Furnace in Basement/Marble window sills/Drapery Rods in
living + dining rooms/

sion: Can you afford it? For most of us, this decision will include looking at the necessary down payment, considering interest rates and applying for (and getting) a loan. *Loan Data* has been included to help you with this decision. (For more information, see the sidebar "How Much?" by Kenneth Johnson.)

When I began writing these programs, I tried to include everything. However, I soon realized this was neither practical nor possible. Both programs are straightforward; customize them to fit your own specifications.

The programs were written for the DMP-105 printer and use the following printer codes:

Printer Codes	**Description**
`CHR$(27)`	Escape
`CHR$(27);CHR$(14)`	Start Elongation
`CHR$(27);CHR$(15)`	End Elongation
`CHR$(27);CHR$(19)`	Standard Print
`CHR$(15)`	Start Underline
`CHR$(14)`	End Underline

If you have a disk system, you can merge the programs by completing the following steps: Delete lines 1030 and 1040 of *Drive By* and save the program in ASCII format. Delete lines 10 through 260 of the second program. Enter `RENUM 1030` and then save the second program in ASCII. Now load the first program again and enter `MERGE "HOUSE"`. Save the merged program as `HOUSHUNT`. The merged program will print out the forms for both *Drive By* and *House*. Each form will use one sheet of paper.

Buying a house is more than just a financial investment. For most of us, the houses we purchase will be our homes. I hope my programs can make such an important step a little easier.

(Questions or comments about these programs may be directed to the author at 826 Elmwood Ave., New Albany, IN 47150. Please include an SASE when requesting a reply.)

How Much?

By Kenneth Johnson

You've found the perfect house. You want it; you're going to buy it. But how are you going to pay for it? You'll get a loan, of course, but what kind of loan? How much will the interest be, and how long will you make payments? Finally, how much will this cost? *Loan Data* (shown in Listing 3) can help you calculate the monthly payments for any loan amount, at any interest rate and for any time period. It also displays the amount of interest you will pay during the life of the loan and lets you alter the variables to find the best loan for you. [Please note: Taxes and insurance premiums vary from state to state and are usually included in the monthly payment on mortgages. Be sure to take these expenses into consideration when figuring the amount you can afford to spend on purchasing a home.]

Loan Data requires 4K of memory and can be loaded from either cassette or disk. My program will consider delayed-payment loans and identify the interest you are charged while your payments are deferred. If you have such a loan, enter the number of days from the day you signed the loan to day of your first payment. The program will consider this data and give you an accurate amortization schedule. If this condition does not apply to you, press `ENTER` at the prompt. The program will calculate interest rates for balloon payment loans and for short term loans and provide an accurate payment schedule.

The program determines your monthly payments and totals your interest for the life of the loan. Once you get over the shock of seeing how much interest you are paying for your home, you can change the interest rate variable in the program. In this way, you can see what a difference a few percentage points can make in the total of a 30-year loan but how little difference it makes in your monthly payments. Please note: There is a slight delay when calculating the total interest for long-term (25- to 40-year) loans.

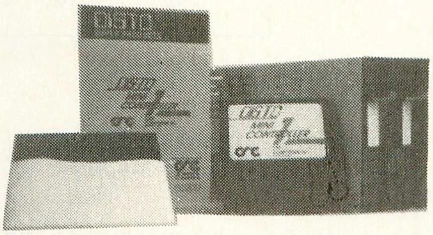
Once you have found the best choice for your own loan-payment plan, you will be able to talk to the bank more intelligently about your expectations about the loan. You will also be able to determine if this is the best time for you to buy a house. ☐

Ken Johnson is a retired air force pilot who purchased a CoCo six years ago to keep up with his grandchildren's computer skills. He hasn't been able to stop using it since.

Color Computer I, II, III

Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.
Tape/Disk Utility...Transfers disk to tape and tape to disk.



159^{95} Drive 0

- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

179^{95} Drive 0

- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

269^{95} Drive 0 & 1

- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

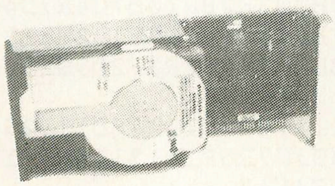
Other Drive Specials

119^{95}
2nd Drive
for new Radio Shack
includes:

- Slim Line DS/DD Drive
- Cabling & Instructions
- Mounting Hardware

Full Ht Drive	89^{95}
Full Ht Drive Ps/Case	129^{95}
Slim Line Drive	99^{95}
Slim Line Drive Ps/Case	139^{95}
2 Slim Drives Ps/Case	239^{95}
Disk Controller	59^{95}
Single Ps & Case	44^{95}
Dual ½ht Ps & Case	54^{95}
Dual Full Ht. Ps & Case	79^{95}
Disk Controller	59^{95}
10 Diskettes with free library case	9^{95}

Quality Add-On's for Tandy 1000, SX, TX, SL, TL, 3000, 4000



HARD CARDS

10 meg	259.95
20 meg	299.95
30 meg	349.95
40 meg	399.95
49 meg	499.95
64 meg	599.95

HARD DRIVE KITS

10 meg kit	249.95
20 meg kit	299.95
30 meg kit	339.95
40 meg kit	399.95
60 meg kit	539.95

1000, 1000A,
Memory Cards

Zucker Memory
- DMA & 512K — CALL

Zucker Multifunction
- Serial
- Real Time Clock
- 512K DMA
- Software

CALL

TANDY 1000
1000, SX, TX, 3000, 4000
2nd Floppy

360K	TEAC	$119.95
720K	Mitsubishi	$99.95
3½"	Mitsubishi	$119.95

1000, 1000A, SX, TX, SL, TL
Hard Drive Controller
Will run 1 or 2
Hard Drives
Supports drives up to 120 megabytes
$99.95

QUALITY
CUSTOMER SERVICE
508-278-6555

TECHNICAL ASSISTANCE
508-278-6556

TOLL FREE ORDER LINE
1-800-635-0300
TRUE DATA PRODUCTS
115 MAIN ST., P.O. BOX 347
UXBRIDGE, MA 01569
508-278-6555
HOURS: MON-FRI. 9-6, SAT. 10-4 (EST)

CORPORATE P.O.'S WELCOMED

ALL PACKAGES SHIPPED UPS
EXCEPT CANADA AND A.P.O.'s
C.O.D.'S ADD $2.30
MASTER CHARGE/VISA ADD 3%
1 YEAR WARRANTY UNLESS
OTHERWISE NOTED
PRICES TERMS CONDITIONS
SUBJECT TO CHANGE WITHOUT
NOTICE

210 4		630 214	
340 214		700 159	
440 225		760 107	
540 186		END 186	

Listing 1: DRIVEBY

```
10 REM $$$$$$$$$$$$$$$$$$$$$$$$$$$
20 REM $          DRIVE BY        $
30 REM $             BY           $
40 REM $    RICHARD K.JOHNSON     $
50 REM $     826 ELMWOOD AVE.     $
60 REM $      NEW ALBANY,IN.      $
70 REM $          47150           $
80 REM $ COPYRIGHT (C) JULY 88 $
90 REM $$$$$$$$$$$$$$$$$$$$$$$$$$$
100 PMODE4,1
110 PCLS
120 SCREEN1,1
130 REM ROAD
140 DRAW"BM4,16;D160R28U68R188D6
8R28U160L28D68L188U68L28"
150 REM SIGN
160 DRAW"BM60,80;U60R16D60L16":D
RAW"BM196,80;L16U60R16D60":DRAW"
BM76,32;R104":DRAW"BM180,68;L104
"
170 REM HOUSE
180 LINE(116,116)-(76,132),PSET
190 LINE(116,116)-(156,132),PSET
200 LINE(152,132)-(152,144),PSET
210 LINE(152,144)-(192,152),PSET
220 LINE(80,132)-(80,144),PSET
230 LINE(80,144)-(64,148),PSET
240 DRAW"BM68,148;D24R120U20"
250 DRAW"BM96,152;L20D12R20U12":
DRAW"BM104,152;D20R16U20L16":DRA
W"BM132,152;R12D12L12U12":DRAW"B
M152,172;U20R32D20":DRAW"BM112,1
28;R12D12L12U12"
260 DRAW"BM148,128;U8R12D26"
270 CIRCLE(195,130),10
280 DRAW"BM195,120;U10BD20BR10R1
0BL20BD10D10BU20BL10L10BR20BH10H
5BF15BE10E5BG15BF10F5BH15BG10G5"
290 REM RAINBOW DR.
300 DRAW"BM16,36;U7R6F1D2G1L6R4F
3"
310 DRAW"BM16,50;U6E2R3F2D3L7R7D
3"
320 DRAW"BM16,66;R4U7L4R8BD7L4"
330 DRAW"BM16,82;U7F7U7"
340 DRAW"BM16,98;U7R6F1D1G1L6R6F
1D2G1L6"
350 DRAW"BM18,114;H2U3E2R4F2D3G2
L4"
360 DRAW"BM16,130;BU7D7E4F4U7"
370 DRAW"BM16,152;U7R5F2D3G2L5"
380 DRAW"BM16,168;U7R5F1D2G1L5R3
F3"
390 REM COCO LANE
400 DRAW"BM238,36;G1L4H2U4E2R4F1
"
410 DRAW"BM233,51;H2U4E2R4F2D4G2
L4"
420 DRAW"BM238,66;G1L4H2U4E2R4F1
"
430 DRAW"BM233,82;H2U4E2R4F2D4G2
L4"
440 DRAW"BM232,114;U7D7R7"
450 DRAW"BM232,130;U5E2R3F2D2L5R
5D3"
460 DRAW"BM232,146;U7F7U7"
470 DRAW"BM232,161;U7R7BD4BL2L5D
4R7"
480 REM HOUSE HUNTING
490 DRAW"BM100,44;U7D3R7U3D7BR8H
2U3E2R3F2D3G2L3BR10BU7D5F2R2E3D3
U7BR6BD5F2R3E1U2H1L3H1U1E1R3F1BR
6BD6U7R6BD3BL2L4D4R6"
500 DRAW"BM90,60;U7D3R7U3D7BR4BU
7D5F2R2E3D3U7BR4BD7U7F7U7BR4R8L4
D7BR8R6L3U7L3R6BR4BD7U7F7U7BR12B
D1H1L4G2D3F2R4E2U2L3"
510 REM RICHARD
520 DRAW"BM40,100;U7R5F1D2G1L4R3
F3BR6BU7R6L3D7L3R6BR10BU1G1L4H2U
3E2R4F1BR4BU1D7U4R7U3D7BR6U6E1R5
F1D3L5R5D3BR6U7R5F1D2G1L5R3F3BR6
U7R4F2D3G2L4"
530 REM JOHNSON
540 DRAW"BM135,98;DF1R3E1U6L4R8B
R6R3F2D3G2L3H2U3E2BR10D7U4R7D4U7
BR5BD7U7F7U7BR5BD5F2R3E1U2H1L3H1
U1E1R3F1BR7BD6H2U3E2R3F2D3G2L3BR
9U7F7U7"
550 DRAW"BM112,82;U11R26D11L26":
DRAW"BM116,80;U7R5F1D1G1L5R5F1D2
G1L5BR14U3H4F4E4"
560 FORP=1TO4500:NEXTP
570 PCLS1
580 CLS:PRINT"SET PAPER TO TOP O
F PRINTER HEAD"
590 PRINT"  WHEN PRINTER IS ON L
INE PRESS           <<<ENTER>>>"
600 EXEC44539
610 IF INKEY$=CHR$(13)THEN 620EL
SE580
620 CLS:INPUT"HOW MANY COPIES (1
-10)";C
630 IFC<1 OR C>10 THEN620 ELSE64
0
640 PR=1
650 POKE150,87'POKE FOR 600 BAUD
 RATE FOR RADIO SHACK DMP 105 PR
INTER
660 FORPR=1 TO C
670 CLS:PRINT@234,"NOW PRINTING"
680 A$="DRIVE BY"
690 PRINT#-2,CHR$(27);CHR$(14);T
```

```
AB((45-LEN(A$))/2);A$:PRINT#-2:P
RINT#-2
700 PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);"ASKING PRICE";
CHR$(15);+"               ";CHR$
(14);:PRINT#-2,TAB(57);"APPRAISE
D VAL.";CHR$(15);+"
  ";CHR$(14)
710 PRINT#-2:PRINT#-2,CHR$(27);C
HR$(15);CHR$(27);CHR$(19);"OWNER
";CHR$(15);+"
              ";CHR$(14);+"REALTO
R";CHR$(15);+"
                  ";CHR$(14)
720 PRINT#-2:PRINT#-2,"ADDRESS";
CHR$(15);+"
       ";CHR$(14);+"AGENT";CHR
$(15);+"
            ";CHR$(14)
730 PRINT#-2:PRINT#-2,"TEL";CHR$
(15);+"
       ";CHR$(14);+"TEL";CHR$(
15);+"
            ";CHR$(14)
740 PRINT#-2:PRINT#-2,"SQUARE FO
OTAGE";CHR$(15);+"        ";CHR
$(14);+" LOT SIZE";CHR$(15);+"
          ";CHR$(14);+" AGE";C
HR$(15);+"          ";CHR$(14);+"
 TAXES";CHR$(15);+"
  ";CHR$(14)
750 PRINT#-2:PRINT#-2,"DIST. FRO
M EMPLOYMENT";CHR$(15);+"
     ";CHR$(14);+" SHOPPING";CHR
$(15);+"          ";CHR$(14);+"
 PUBLIC TRANS.";CHR$(15);+"
        ";CHR$(14)"
760 PRINT#-2:PRINT#-2,CHR$(14);"
SCHOOLS AND CHURCHES IN AREA";CH
R$(15);+"
                                ";C
HR$(14)
770 PRINT#-2:PRINT#-2,"NEIGHBORH
OOD * PLUSES *";CHR$(15);+"
                    ";CHR$(14)
780 PRINT#-2:PRINT#-2,"NEIGHBORH
OOD * MINUSES *";CHR$(15);+"
                    ";CHR$(14)
790 PRINT#-2
800 B$="EXTERIOR OBSERVATIONS"
810 PRINT#-2:PRINT#-2,CHR$(14)CH
R$(27);CHR$(14);TAB((45-LEN(B$))
/2);B$:PRINT#-2
820 PRINT#-2:PRINT#-2,CHR$(27);C
HR$(15);CHR$(27);CHR$(19);"STYLE
: ()RANCH  ()BI-LEVEL  ()TRI-LEV
```

The COCO hardware store

CRC COMPUTERS

DISTO Super Controller I $99.95

A Superb Controller. Along with the included C-DOS, plug-in three more software selectable DOSes or 2764 or 27128 EPROMs burned to your liking. The Internal M.E.B. lets you add Disto incredible Super Add-ons.

$130. Fantastic Super Controller II

- Under OS-9:
- Buffered Read/Write sector achieved without halting the CPU.
- Continual use of keyboard even while reading or writing to disk.
- System's clock no longer looses time during Read & Write.
- NMI is blocked and transferred to IRQ in software for low CPU overhead.
- Completely Interrupt driven for fast & smooth Multi-Tasking operations.
- Drivers written by KEVIN DARLING
- Now Available at your Local Radio Shack store PN 90-2009

DISTO 3 in 1 Multi-Board Adapter $59.95

This Muti-Board is an adapter that plugs in any Disto Super Controller, Ramdisk or MEB Adapter. It includes a new and improved Printer Port (Centronics compatible), a faster Real Time Clock (works at 2MHz.) and a true RS-232 Serial Port (external 12 volt AC adapter required). DB25 cable included. It fits neatly inside the metal case and is still within Tandy's power limits. It also works with or without a Multi-Pak.

DISTO SUPER ADD-ONS

- Real Time Clock & Printer Interface $34.95
- Mini EPROM Programmer $54.95
- Hard Disk Interface $49.95
- Hard Disk Interface with RS-232 $79.95
- Super RAM 3 ZeroK Board $24.95
- MEB Adapter $24.95

DISTO Mini Controller $74.95 NEW

- Radio Shack/Tandy controller compatible
- Works on all COCOs with or without Multi-Pack
- 2 DOS switcher
- Accepts 24 or 28 pin EPROMs
- Low power draw and Gold plated edge connectors

DISTO RS-232 SuperPack

- A Stand-Alone (Multi-Pak required) adapter that gives the user a true RS-232 Serial Port.
- Completely compatible with OS9's ACIA software.
- Compatible with software that requires the Tandy Deluxe RS-232 Pack.
- DB-25 cable included.

$49.95

Master Card and Visa Accepted

CRC COMPUTERS INC.
10802 Lajeunesse, Montreal, Quebec, Canada H3L 2E8

1-514-383-5293

We accept phone orders • Call for Canadian Prices
Include S&H of $4 or $8 if order exceeds $75
Sorry: No personal cheques

```
EL  ()COLONIAL  ()OTHER ";CHR$(1
5);+"                    ";CHR$(1
4)
830 PRINT#-2:PRINT#-2,"EXTERIOR
WALLS:()BRICK  ()WOOD  ()VINYL S
IDING  ()ALUM SIDING  ()OTHER";C
HR$(15);+"          ";CHR$(14)
840 PRINT#-2:PRINT#-2,"COLOR OF
EXTERIOR WALLS";CHR$(15);+"
     ";CHR$(14);+"  TRIM";C
HR$(15);+"               ";CHR$(
14);+"  ROOF";CHR$(15);+"
     ";CHR$(14)
850 PRINT#-2:PRINT#-2,"()GARAGE
 ATT/DET  SIZE";CHR$(15);+"
 CAR";CHR$(14);+"  ()CARPORT  SI
ZE";CHR$(15);+"       CAR";CHR$(1
4);+"  ()SHED  SIZE";CHR$(15);+"
     ";CHR$(14)
860 PRINT#-2:PRINT#-2,"()DRIVEWA
Y  SIZE";CHR$(15);+"     ";CHR$
(14);;"  ()CONCRETE  ()ASPHALT
()GRAVEL  CONDITION";CHR$(15);+"
          ";CHR$(14)
870 PRINT#-2:PRINT#-2,"ROOF COND
ITION ()NEW  ()GOOD  ()FAIR  ()
NEEDS REPLACING    AGE OF ROOF";
CHR$(15);+"         ";CHR$(14)
880 PRINT#-2:PRINT#-2,"CONDITION
S OF GUTTERS AND DOWNSPOUTS ()NE
W  ()GOOD  ()FAIR  ()NEEDS REPLA
CING"
890 PRINT#-2:PRINT#-2,"TYPE OF F
OUNDATION ()SLAB  ()CRAWLSPACE
()BASEMENT    SUMP PUMP ()YES  (
)NO"
900 PRINT#-2:PRINT#-2,"()SIDEWAL
K ON PROPERTY    ()PUBLIC SIDEWA
LKS    ()STEPPING STONES"
910 PRINT#-2:PRINT#-2,"WINDOW TY
PE ()ALUM  ()WOOD  ()PICTURE WIN
DOW  ()BAY WINDOW  ()OTHER";CHR$
(15);+"             ";CHR$(14)
920 PRINT#-2:PRINT#-2,"STORM WIN
DOWS & DOORS ()YES  ()NO  COMMEN
TS";CHR$(15);+"
                ";CHR$(14)
930 PRINT#-2:PRINT#-2,"()STOOPS
 ()PORCH  ()PATIO  ()DECK  SIZE"
;CHR$(15);+"        ";CHR$(14)
;+"  ()RAILING  TYPE";CHR$(15);+
"            ";CHR$(14)
940 PRINT#-2:PRINT#-2,"FENCE ()Y
ES ()NO   TYPE ()CHAIN LINK  ()W
OOD  ()PRIVACY  NO. OF GATES";CH
R$(15);+"        ";CHR$(14)
950 PRINT#-2:PRINT#-2,"LANDSCAPE
 CONDITION";CHR$(15);+"

                ";CHR$(14)
960 PRINT#-2:PRINT#-2,"SHRUBBERY
 TYPE";CHR$(15);+"              "
;CHR$(14);+" SHADE TREES";CHR$(1
5);+"           ";CHR$(14);+
"FRUIT TREES";CHR$(15);+"
       ";CHR$(14)
970 PRINT#-2:PRINT#-2,CHR$(15);"
COMMENTS

                "
980 PRINT#-2:PRINT#-2,"

       "
990 PRINT#-2:PRINT#-2,"

       "
1000 PRINT#-2:PRINT#-2,"

        "
1010 PRINT#-2:PRINT#-2,"

        ";CHR$(14)
1020 PRINT#-2:PRINT#-2
1030 NEXTPR
1040 CLS:PRINT@231,"GOOD HOUSE H
UNTING"
```

250	244	840	187
420	19	900	36
540	167	970	129
700	18	END	191
750	171		

Listing 2: HOUSE

```
10 CLS
20 REM $$$$$$$$$$$$$$$$$$$$$$$$$
30 REM $      HOUSE HUNTING     $
40 REM $           BY           $
50 REM $   RICHARD K.JOHNSON    $
60 REM $    826 ELMWOOD AVE.    $
70 REM $     NEW ALBANY,IN.     $
80 REM $         47150          $
90 REM $ COPYRIGHT (C) JULY 88 $
100 REM $$$$$$$$$$$$$$$$$$$$$$$$
$
110 PRINT@166,"$$$$$$$$$$$$$$$$$
$$$$"
120 PRINT@198,"$   HOUSE HUNTING
  $"
130 PRINT@230,"$          BY
  $"
```

```
140 PRINT@262,"$  RICHARD JOHNSO
N  $"
150 PRINT@294,"$$$$$$$$$$$$$$$$$
$$$$"
160 FORP=1TO3000:NEXTP
170 CLS:PRINT"SET PAPER TO TOP O
F PRINTER HEAD"
180 PRINT"  WHEN PRINTER IS ON L
INE PRESS             <<<ENTER>>>"
190 EXEC44539
200 IF INKEY$=CHR$(13)THEN 210EL
SE170
210 CLS:INPUT"HOW MANY COPIES (1
-10)";C
220 IFC<1 OR C>10 THEN210 ELSE23
0
230 PR=1
240 POKE150,87'POKE FOR 600 BAUD
 RATE FOR RADIO SHACK DMP 105 PR
INTER
250 FORPR=1 TO C
260 CLS:PRINT@234,"NOW PRINTING"
270 C$="HOUSE HUNTING"
280 PRINT#-2,CHR$(27);CHR$(14);T
AB((45-LEN(C$))/2);C$:PRINT#-2
290 D$="INTERIOR INSPECTION"
300 PRINT#-2,TAB((42-LEN(D$))/2)
;D$
310 PRINT#-2,CHR$(15);"
                                "
;CHR$(14)
320 PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);"
 1/2/B # OF # OF  TEL. WALL   WA
LL  FLOOR  FLOOR CEILING""
330 PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);CHR$(15);"ROOMS
    SIZE  LEVEL WND. CLOS. OUT.
COLOR  DESC. TYPE    COLOR    FAN
         "
340 PRINT#-2,"FOYER  /     /
  /   /    /    /    /    /
     /     /     /    /    /"
350 PRINT#-2,"LIVING /     /
  /   /    /    /    /    /
     /     /     /    /    /"
360 PRINT#-2,"DINING /     /
  /   /    /    /    /    /
     /     /     /    /    /"
370 PRINT#-2,"
                                "
380 PRINT#-2,"1 BED  /     /
  /   /    /    /    /    /
     /     /     /    /    /"
390 PRINT#-2,"2 BED  /     /
  /   /    /    /    /    /
     /     /     /    /    /"
400 PRINT#-2,"3 BED  /     /
  /   /    /    /    /    /
     /     /     /    /    /"
410 PRINT#-2,"4 BED  /     /
  /   /    /    /    /    /
     /     /     /    /    /"
420 PRINT#-2,"
                                "
430 PRINT#-2,"KIT.   /     /
  /   /    /    /    /    /
     /     /     /    /    /"
440 PRINT#-2,"
                                "
450 PRINT#-2,"UTILITY/     /
  /   /    /    /    /    /
     /     /     /    /    /"
460 PRINT#-2,"MUD    /     /
  /   /    /    /    /    /
     /     /     /    /    /"
470 PRINT#-2,"FAMILY /     /
  /   /    /    /    /    /
     /     /     /    /    /"
480 PRINT#-2,"BASEMT /     /
  /   /    /    /    /    /
     /     /     /    /    /"
490 PRINT#-2,"       /     /
  /   /    /    /    /    /
     /     /     /    /    /"
500 PRINT#-2,"       /     /
  /   /    /    /    /    /
```

Introducing **CoCo MIDI 3**! The familiar MIDI sequencer is more powerful than ever! No other sequencer program for the Color Computer can rival the ease of use and powerful editing capabilities. In addition to high performance recording and playback, CoCo MIDI 3 has extensive editing capabilities. Such as block cut, copy, and paste. Quantize a block; scale velocities or a controller value; change the channel assignment of a block. Multipak or Y cable required. Includes a hardware MIDI interface and cables. $149.95. CoCo MIDI hardware interface available separately $99.95. CoCo MIDI 2 software also available $34.95.

Introducing **FB01EDIT**... our new FB-01 voice editor! Edit and creat new FB-01 voices on your CoCo 3. Full 80 column display makes it easy to see all the data at once. Save banks to disk. Receive data from FB-01 and send it back. Requires CoCo MIDI hardware pack. $29.95. **FB-01 Calc** creates custom configurations for your FB-01 and Lyra. $19.95. **Music Library** is a collection of music to play on your CoCo (no extras needed!). Each disk $5.00. **Musica 2**, the companion music composition program, is only $24.95.

Andante

Rulaford Research
P.O. Box 143
Imperial Beach, CA 92032
(619) 690-3648 (evenings 6-10 PT)

Lyra Lybrary is an extensive collection of music to use with your MIDI synthesizer. See review in December 1988 Rainbow magazine. Each disk $14.95. **Lyra** is a powerful yet easy-to-use MIDI music composition program. Comes with MIDI cable. Only $59.95.
Ordering information: send check or money order. Sorry, no credit cards. COD is ok. Shipping and handling included in price. CA residents add 6% tax.

We Cannot Tell A Lie

Lonnie's gone nuts!! He's chopped down prices on Rainbow Bookshelf items!

The Complete Rainbow Guide to OS-9

Authors Dale Puckett and Peter Dibble show how to take advantage of OS-9's multitasking and multiuser features. An easy-to-read, step-by-step guide packed with hints, tips, tutorials and free software in the form of program listings.
Book $12.95, Disk Package $19.95 (2 disks, book not included) — a savings of up to 36%!

SAVE 38%! Book and disks only $29.95

The Rainbow Book of Simulations

20 award-winning entries from THE RAINBOW's first Simulations contest. You are a Civil War Commander, an air traffic controller, a civil defense coordinator, or a scientist on Mars . . . your wits are on the line.
Book $3.50, Tape $3.50 — a savings of 65%!

SAVE 70%! Book and tape only $6

The Second Rainbow Book of Simulations

The 16 winners from our second Simulations contest. Fly through dense African jungle, bull your way down Wall Street, lead a bomb squad, or try your hand at Olympic events. Test your skills and talents.
Book $4.95, Tape or Disk $4.95 — a 50% savings!

SAVE 55%! Book and tape only $8.95

SAVE 57%! Book and disk only $8.95

SAVE UP TO 70%

The Rainbow Introductory Guide to Statistics

Dr. Michael Plog and Dr. Norman Stenzel give a solid introduction to the realm of statistical processes and thinking for both the beginner and the professional. (80-column printer required.)
Book $2.95, Tape or Disk $2.95 — a savings of 54%!

SAVE 62%! Book and tape or disk only $4.95

The First Rainbow Book of Adventures

Contains 14 winning programs from our first Adventure contest. Includes *Sir Randolph of the Moors, Horror House, One Room, Dr. Avaloe* and more. Plus hints, tips on solving Adventures.
Book $2, Tape $2 — a 43% savings!

SAVE 50%! Book and tape only $3.50

The Second Rainbow Book of Adventures

Featuring 24 of the most challenging Adventure games ever compiled. Meet the Beatles and battle the Blue Meanies, find a hidden fortune, or win the heart of a mysterious princess. *Ring Quest, Secret Agent Man, Dark Castle, Curse of Karos* and more!
Book $6.95, Tape $6.95 — a 50% savings!

SAVE 57%! Book and tape only $11.95

The Third Rainbow Book of Adventures

The excitement continues with 19 new Adventures. Discover backstage intrigue at the London Theatre, attempt a daring space rescue, or defeat evil in the year 2091 as a genetic android. *Evil Crypt, Spymaster, Time Machine, The Amulet*, and that's only the beginning!
Book $6.95, Tape $6.95, Two-Disk Set $7.95 — a savings of up to 47%!

SAVE 45%! Book and tape only $11.95

SAVE 52%! Book and disk only $12.95

Name ____________________
Address ____________________
City ____________________
State ____________________ ZIP __________
☐ Payment Enclosed, or ☐ Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number ____________________
Card Expiration Date ____________________
Signature ____________________

Please send me:

☐ **The Rainbow Book of Simulations** (first)	~~$ 9.95~~ $ 3.50	________
☐ Rainbow Simulations Tape(first)	~~$ 9.95~~ $ 3.50	________
☐ First Simulations Package	~~$19.90 $11.95~~ $ 6.00	________
☐ **The Second Rainbow Book of Simulations**	~~$ 9.95~~ $ 4.95	________
☐ Second Rainbow Simulations Tape	~~$ 9.95~~ $ 4.95	________
☐ Second Rainbow Simulations Disk	~~$10.95~~ $ 4.95	________
☐ Second Simulations Package with Tape	~~$19.90 $12.95~~ $ 8.95	________
☐ Second Simulations Package with Disk	~~$20.90 $13.95~~ $ 8.95	________
☐ **The Complete Rainbow Guide to OS-9**	~~$19.95 $16.95~~ $12.95	________
☐ Rainbow Guide to OS-9 Disk Set (2 disks)	~~$31.00~~ $19.95	________
☐ Rainbow Guide to OS-9 Package	~~$47.95 $36.95~~ $29.95	________
☐ **The Windows & Applications Disk for** The Complete Rainbow Guide to OS-9 Level II, Vol. I	$19.95	________
☐ **The Rainbow Book of Adventures** (first)	~~$ 7.95 $ 3.50~~ $ 2.00	________
☐ Rainbow Adventures Tape (first)	~~$ 7.95 $ 3.50~~ $ 2.00	________
☐ First Adventure Package	~~$15.90 $ 7.00~~ $ 3.50	________
☐ **The Second Rainbow Book of Adventures**	~~$13.95~~ $ 6.95	________
☐ Second Rainbow Adventures Tape	~~$13.95~~ $ 6.95	________
☐ Second Adventure Package	~~$27.90 $17.95~~ $11.95	________
☐ **The Third Rainbow Book of Adventures**	~~$11.95~~ $ 6.95	________
☐ Third Adventures Tape	~~$ 9.95~~ $ 6.95	________
☐ Third Adventures Disk Set (2 disks)	~~$14.95~~ $ 7.95	________
☐ Third Adventure Package with Tape	~~$21.90 $15.95~~ $11.95	________
☐ Third Adventure Package with Disk	~~$26.90 $16.95~~ $12.95	________
☐ **Introductory Guide to Statistics**	~~$ 6.95~~ $ 2.95	________
☐ Guide to Statistics Tape or Disk (indicate choice)	~~$ 5.95~~ $ 2.95	________
☐ Guide to Statistics Package (indicate choice of tape or disk)	~~$12.90 $ 8.95~~ $ 4.95	________
Add $1.50 per book Shipping and Handling in U.S.		________
Outside U.S., add $4 per book		________
Kentucky residents add 5% sales tax		________
(Allow 6 to 8 weeks for delivery)	Total	________

Mail to: Rainbow Bookshelf, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. To order by phone (*credit card orders only*) call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call (502) 228-4492.

Please note: The tapes and disks offered by The Rainbow Bookshelf are not stand-alone products. That is, they are intended to be an adjunct and complement to the books. Even if you buy the tape or disk, you will still need the appropriate book for loading and operating instructions. OS-9® is a registered trademark of the Microware Systems Corporation.

```
     /      /      /    /    /"
510 PRINT#-2,"

                              "
520 PRINT#-2,"1 BATH  /      /
  /    /    /    /       /    /
     /      /      /    /    /"
530 PRINT#-2,"2 BATH  /      /
  /    /    /    /       /    /
     /      /      /    /    /"
540 PRINT#-2,"3 BATH  /      /
  /    /    /    /       /    /
     /      /      /    /    /"
550 PRINT#-2,"4 BATH  /      /
  /    /    /    /       /    /
     /      /      /    /    /"
560 PRINT#-2,"

                              ";
CHR$(14)
570 PRINT#-2,"          FULL
       TILE  SINK   SIZE  MED. V
ENT SIZE      "
580 PRINT#-2,CHR$(15);"
HALF TUB SHOWER COLOR COLOR VANI
TY CAB  FAN MIRROR
       "
590 PRINT#-2,"1 BATH  /     /  /
      /     /     /      /   /
  /      /     /      /      /"
600 PRINT#-2,"2 BATH  /     /  /
      /     /     /      /   /
  /      /     /      /      /"
610 PRINT#-2,"3 BATH  /     /  /
      /     /     /      /   /
  /      /     /      /      /"
620 PRINT#-2,"4 BATH  /     /  /
      /     /     /      /   /
  /      /     /      /      /"
630 PRINT#-2,"

                              ";
CHR$(14)
640 PRINT#-2,"KITCHEN APPLIANCES
 INCLUDED:  COMMENTS";CHR$(15);+
"
          ";CHR$(14)
650 PRINT#-2,"()REFRIGERATOR  ()
RANGE E/G  ()OVEN E/G  ()COOKTOP
 E/G  ()DISPOSAL ()COMPACTOR"
660 PRINT#-2,CHR$(15)"()FREEZER
 ()MICROWAVE  ()HOOD FAN  ()WATE
R SOFTNER  ()DISHWASHER  ()
       "
670 PRINT#-2,CHR$(15)"



      ";CHR$(14)
680 PRINT#-2,"CABINETS: #OF DOOR
S";CHR$(15);+"      ";CHR$(14);+"
#OF DRAWERS";CHR$(15);+"     ";C
HR$(14);+"COUNTER SPACE";CHR$(15
);+"     FT.";CHR$(14);+"  COND."
;CHR$(15);+"           ";CHR$(
14)
690 PRINT#-2,"()PANTRY  ()BAR  (
)WORK ISLAND *SINK SIZE";CHR$(15
);+"        ";CHR$(14);+"TYPE"
;CHR$(15);+"       ";CHR$(14)
;+"COLOR";CHR$(15);+"         "
;CHR$(14)
700 PRINT#-2,"()WASHER/DRYER CON
NECTIONS  E/G  LOCATIONS";CHR$(1
5);+"       ";CHR$(14);+"  *(
)WASHER  ()DRYER  E/G"
710 PRINT#-2,"WATER HEATER  E/G/
S  SIZE";CHR$(15);+"   GALS.";C
HR$(14);+"  AGE";CHR$(15);+"
 YRS.";CHR$(14);+"  *()SEWER  (
)SEPTIC TANK"
720 PRINT#-2,"HEAT: E/G/S/O/WB T
YPE";CHR$(15);+"        ";CHR$
(14);+" SIZE";CHR$(15);+"
 BTU";CHR$(14);+" AGE";CHR$(15);
+"     ";CHR$(14);+"  ()AIR CL
EANER SYSTEM"
730 PRINT#-2,"()HEAT PUMP  AIR C
ONDITIONING: TYPE ()CENTRAL  ()W
INDOW  SIZE";CHR$(15);+"
";CHR$(14);+"  AGE";CHR$(15);+"
     ";CHR$(14)
740 PRINT#-2,"INSULATION: CEILIN
G";CHR$(15);+"     IN.";CHR$(14)
;+" WALLS";CHR$(15);+"     IN.";
CHR$(14);+" FLOOR";CHR$(15);+"
   IN.";CHR$(14);+" COMMENTS";CH
R$(15);+"           ";CHR$(
14)
750 PRINT#-2,"AVG. UTILITY BILLS
  ELEC.";CHR$(15);+"        ";C
HR$(14);+"  GAS";CHR$(15);+"
    ";CHR$(14);+"  WATER";CHR$(1
5);+"     ";CHR$(14);+"  SEW
ER";CHR$(15);+"       ";CHR$(
14)
760 PRINT#-2,"ELECTRIC PANEL: ()
FUSE  ()BREAKER  SIZE";CHR$(15);
+"     AMP.";CHR$(14);+"  LOCATI
ON";CHR$(15);+"
     ";CHR$(14)
770 PRINT#-2:PRINT#-2,CHR$(15);"
COMMENTS


                "
780 PRINT#-2:PRINT#-2,"


       "
790 PRINT#-2:PRINT#-2,"


       "
```

```
800 PRINT#-2:PRINT#-2,"


      "
810 PRINT#-2:PRINT#-2,"


      "
820 PRINT#-2:PRINT#-2,"
```

```
                    "
830 PRINT#-2:PRINT#-2,"


                "; CHR$(14)
840 PRINT#-2:PRINT#-2:PRINT#-2
850 NEXTPR
860 CLS:PRINT@231,"GOOD HOUSE HU
NTING"
```

260	64	750	98
420	235	890	3
630	151	END	5

Listing 3: LOAN DATA

```
10 CLS4:C=2:X=3
20 IF C>3 THEN C=2:IF X<2 THEN X
=3
30 FOR H=0 TO 63 STEP 4:FOR V=0
TO 1
40 SET (H,V,C):SET(H+1,V,C)
50 SET (H+2,V,X):SET(H+3,V,X)
60 NEXT V,H
70 FOR H= 62 TO 63:FOR V= 2 TO 2
9 STEP 4
80 SET (H,V,C):SET(H,V+1,C)
90 SET (H,V+2,X):SET(H,V+3,X)
100 NEXT V,H
110 FOR H=63 TO 0 STEP -4:FOR V=
30 TO 31
120 SET(H,V,C):SET(H-1,V,C)
130 SET(H-2,V,X):SET(H-3,V,X)
140 NEXT V,H
150 FOR H=0 TO 1:FOR V=29 TO 2 S
TEP -4
160 SET (H,V,C):SET(H,V-1,C)
170 SET (H,V-2,X):SET(H,V-3,X)
180 NEXT V,H
190 PRINT@ (138)," LOAN DATA ";
200 PRINT@(237)," BY: ";
210 PRINT@(329)," KEN JOHNSON ";
220 PRINT@(364)," 1985 ";
230 FOR DLAY=1 TO 1500:NEXT DLAY
240 U$="######.##":V$="          "
250 CLS:PRINT@(72),"<<<LOAN DATA
>>>":PRINT
260 PRINT@(140),"-MENU-":PRINT:P
RINT
270 PRINT"        (C)ALCULATE PAYM
ENT":PRINT
280 PRINT"        (S)CHEDULE PRINT
OUT":PRINT:PRINT
290 PRINT"        MAKE SELECTION:
C/S"
300 I$=INKEY$:IF I$="C" THEN 310
 ELSE IF I$="S" THEN 600 ELSE 30
0
310 CLS:PRINT:PRINT:PRINT"
    DATA ENTRIES:":PRINT
320 L=0:IT=0:P=0:W=0
330 INPUT" LOAN BALANCE";A
340 INPUT" INTEREST RATE";B
350 INPUT" TERM IN MONTHS";C
360 PRINT:PRINT:PRINT"          CH
ECK ENTRIES...."
370 PRINT:PRINT"   PRESS (C)ONTI
NUE OR (R)EDO"
380 CE$=INKEY$:IF CE$="C"THEN 39
0 ELSE IF CE$="R" THEN 310 ELSE
380
390 IF B<1 THEN B=B*100
400 I=(B/100)/12
410 M=I/((1+I)^(C)-1)+I:D=M*A
420 CLS:PRINT:PRINT:PRINT" LOAN:

$";:PRINT USINGU$;A
```

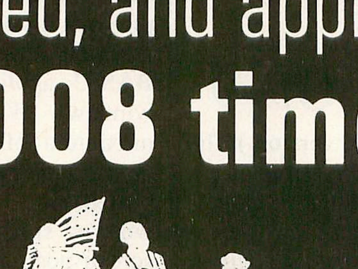
```
430 PRINT" RATE:";B;"%"
440 PRINT" TERM:";C;"MONTHS"
450 PRINT" PYMT: $";:PRINT USING
U$;D
460 PRINT:PRINT" CALCULATING TOT
AL INTEREST...."
470 K=A
480 FORY=1 TO C
490 R=B/100:DD=D
500 I=(K*R)/12
510 W=W+I
520 IT=W
530 P=DD-I:NB=K-P
540 K=NB
550 NEXT Y
560 PRINT:PRINT " TOTAL INTEREST
: $";:PRINT USINGU$;IT
570 PRINT:PRINT:PRINT" (T)RY ANO
THER (M)AKE PRINTOUT"
580 PRINT" (E)ND PROGRAM (R)ETUR
N TO MENU"
590 I$=INKEY$:IF I$="T"THEN 310
ELSE IF I$="M" THEN 710 ELSE IF
I$="R" THEN 250 ELSE IF I$="E" T
HEN CLS:END ELSE 590
600 CLS:PRINT:PRINT:PRINT"      A
MORTIZATION SCHEDULE":PRINT
610 PRINT
620 INPUT" ENTER LOAN BALANCE ";
A
630 INPUT" ENTER INTEREST RATE "
;B
640 INPUT" ENTER TERM IN MONTHS
";C
650 INPUT" ENTER AMOUNT OF PYMT.
 ";D
660 PRINT" DAYS FIRST PYMT DELAY
ED."
670 INPUT" IF N/A PRESS <ENTER>"
;E
680 PRINT:PRINT:PRINT"         CH
ECK ENTRIES...."
690 PRINT:PRINT"   PRESS (C)ONTI
NUE OR (REDO)"
700 CP$=INKEY$:IF CP$="C"THEN 71
0 ELSE IF CP$="R" THEN 600 ELSE
700
710 CLS:PRINT@ (102),"MAKE PRINT
ER READY !":PRINT:PRINT
720 PRINT"PRESS: (P)RINT  (R)E-E
NTER DATA"
730 PRINT"       (A)BORT  (E)ND
PROGRAM"
740 I$=INKEY$:IFI$="P"THEN 750EL
SE IF I$="R"THENCLS:GOTO600ELSE
IFI$="A"THEN GOTO250 ELSE IF I$=
"E"THEN END ELSE 740
750 QQ=PEEK(65314):IF QQ><4 THEN
 CLS:PRINT@ (102),"PRINTER NOT R
EADY !"
760 PRINT#-2:PRINT#-2:L=2:PN=1
```

```
770 CLS:PRINT#-2,"
          <<< AMORTIZATION SCHE
DULE >>>":PRINT#-2:PRINT#-2:PRIN
T#-2:L=L+4:Y=0
780 CLS:PRINT@ (103), "PRINTING
SCHEDULE"
790 PRINT#-2,"  LOAN: ";:PRINT#-
2,USINGU$;A;:PRINT#-2,"    INT.R
ATE:"B;:PRINT#-2,"%";:PRINT#-2,"
     TERM:"C;:PRINT#-2,"MONTHS";
:PRINT#-2,"      PAYMENT:";:PRINT
#-2,USINGU$;D;:PRINT#-2:PRINT#-2
:L=L+3:GOSUB 970
800 K=A:IF B<1 THEN B=B*100
810 FOR Y= 1 TO C
820 R=B/100:DD=D
830 IF Y=1 AND E<>0 THEN I=((R*A
)/365)*E ELSE I=(K*R)/12
840 P=DD-I:NB=K-(DD-I)
850 IF Y=C THEN DD=K+I:P=K:NB=0:
GOTO880
860 K=NB
870 IF Y=C THEN DD=NB+I:P=NB:NB=
0
880 PRINT#-2,USING"###. ";Y;:PRI
NT #-2," <............> ";:PRIN
T#-2,USINGU$;DD;:PRINT#-2,V$;:PR
INT#-2,USINGU$;I;:PRINT#-2,V$;:P
RINT#-2,USINGU$;P;:PRINT#-2,V$;:
PRINT#-2,USINGU$;NB:L=L+1
890 IF C<25 THEN PRINT#-2:L=L+1
900 IF L=62 AND Y<C THEN GOSUB 1
010
910 NEXT Y
920 PRINT#-2:PRINT#-2:PRINT#-2,T
AB(34)"<LAST PAGE>"
930 CLS:PRINT:PRINT:PRINT:PRINT:
PRINT"PRESS: (A)NOTHER COPY"
940 PRINT"       (R)E-RUN PROGRA
M"
950 PRINT"       (Q)UIT; CLEAR M
EMORY"
960 I$=INKEY$:IF I$="A" THEN CLS
:GOTO 720 ELSE IF I$="R" THEN RU
N ELSE IF I$="Q" THEN POKE 113,0
:EXEC 40999 ELSE 960
970 IF Y=0 THEN 980 ELSE IF Y>1
THEN PRINT#-2:PRINT#-2:PRINT#-2:
L=L+3
980 PRINT#-2,STRING$(80,45):L=L+
1
990 PRINT#-2," PYMT.#    PYMT.DA
TE     AMOUNT        INT.
   PRINCIPLE        BALANCE":L=L
+1
1000 PRINT#-2,STRING$(80,45):PRI
NT #-2:L=L+2:RETURN
1010 PRINT#-2:PRINT#-2:PRINT#-2,
TAB(36)"PAGE"PN:PN=PN+1:PRINT#-2
:PRINT#-2:PRINT#-2:L=2:GOSUB 970
:RETURN
```

Tandy Users Unite!

This year Tandy users like you came together on GEnie™ to get their Tandy questions answered by experts, their Tandy games won, their Tandy systems updated and their online Tandy opinions confirmed, researched, and applauded

140,008 times.



Join the Revolution.

GEnie.™

For the people,
by the people.

You've never been a follower. You want your voice heard. You want straight, unbiased information about your hardware and software. You want independent news. Opinions. And control.

GEnie understands. In the Tandy RoundTable on GEnie, the people determine what is discussed. And since GEnie is not a hardware or software developer, you'll get the most objective information about what's new on the market. That's why smart Tandy users like yourself turned to us over 100,000 times this year. That's why you should too.

GEnie makes sure you have access to all kinds of great Tandy software—including thousands of games, education and business productivity programs as well as hard-working utilities to expand your Tandy. And the experts you trust will be online when you log on. Plus news, shopping, travel and reference data. All for only 8¢ a minute.

Sign-up is just $29.95, and your first 2 hours are free.* There are no hidden charges or monthly minimums. Now it's your call.

Here's how easy it is to sign-up from your keyboard now.

1. Have your major credit card or checking account number ready.
2. Set your modem for local echo (half-duplex)—300 or 1200 baud.
3. Dial 1-800-638-8369. When connected, enter HHH
4. At the U#=prompt enter **XJM11712,GEnie** then RETURN.

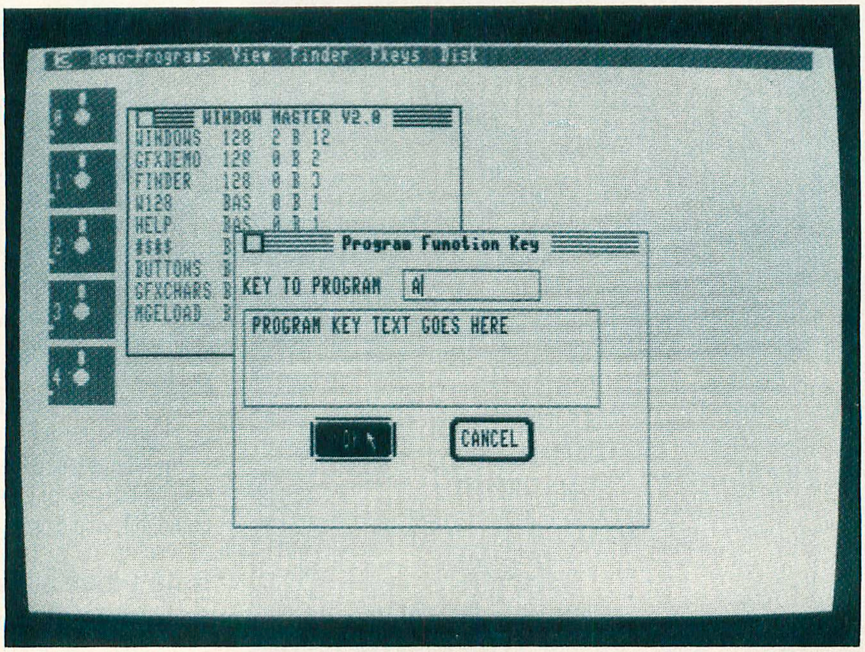
Need help or more information? No modem yet? We can help. In the U.S. or Canada call 1-800-638-9636. Join the online Revolution and let your voice be heard.

We bring good things to life.

---

*Basic rates and services in effect 9/88 apply in U.S. only. Non-prime time rates apply Mon.-Fri. 6PM-8AM local time and all day Sat., Sun., and nat'l. holidays. Subject to service availability. Some services offered on GEnie may include additional charges.
*$10 credit applies. Offer good for 30 days from sign-up.

©1988 General Electric Company, U.S.A.



```
WINDOWS  128  2 B 12
GFXDEMO  128  0 B 2
FINDER   128  0 B 3
W128     BAS  0 B 1
HELP     BAS  0 B 1
$$$      B
BUTTONS  B
GFXCHARS B
MGELOAD  B
```

KEY TO PROGRAM A

PROGRAM KEY TEXT GOES HERE

Software CoCo 3

Window Master— Advanced Features — Without OS-9

Have you ever seen a product advertisement you couldn't believe? You know the kind — "... it slices, it dices... all for $19.95." We've all seen unbelievable ones. When I saw the advertisement for *Window Master*, I believed about half of what I read. However, seeing is believing, and once I saw this program in action, I became a believer.

Window Master is a point-and-click graphics operating environment that uses either a 320-by-225 screen with 16 colors or a 640-by-225 screen with four colors. The program requires a Color Computer 3; *512K is recommended*. (There is a 128K version, which works well, but it has a limited range of features. In this review I will discuss only the 512K version.) The program also requires a disk drive, a Hi-Res joystick adapter, a color or monochrome monitor, and a mouse or joystick.

The program provides the user with a wide range of new features through *Window BASIC*, an extension of Disk Extended BASIC that uses normal BASIC commands to control windows, pull-down menus, buttons, icons, edit fields, etc. This version of BASIC is automatically installed in your system when the program is loaded into the CoCo 3. In addition, the program is fully compatible with Disk Extended BASIC and takes none of CoCo's BASIC memory.

Window Master is easy to load — just type `RUN"W"` and the BASIC program will load and execute *Window Master*'s installation code. In a 512K system, the program installs two RAM disks.

Using this program, you can create BASIC applications that use multiple windows. *Window Master* supports a maximum of 31 windows onscreen at once. Overlapping windows are also supported. You have a choice of six different window styles and any window size or screen position. You use your mouse to move the windows anywhere on the screen. Didn't they say only OS-9 could do all that? Move over, *Multi-Vue*.

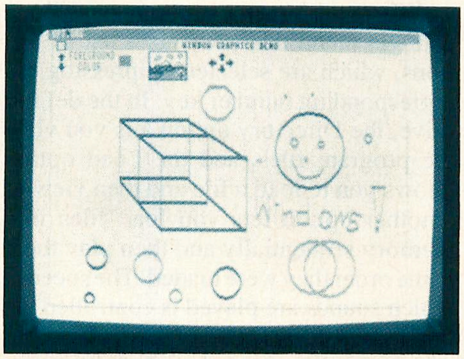
Window Master features true event-trapping — a capability that allows a program to detect and respond to certain *events* and branch to the appropriate routine. Events that can be trapped include time passage, selection of a menu item or a keyboard key, etc. The program also includes a set of menu statements and functions that give you all the tools needed to create custom menu-bar options and subtopics under these new headings.

The Mouse statements let you incorporate the mouse into any program. These statements can identify the location of a mouse on the screen — including the window number — and whether or not the mouse has been clicked. In addition, the Mouse statements let you enable or disable the mouse and set the type of mouse pointer displayed.

Other *Window Master* statements include Edit Field statements (useful for those of us who must create forms), the Pen Size statement, a Protect statement and WEdit. The Protect statement is used to protect a specified number of lines in the current window, which can keep the top of the window from scrolling off the screen. The WEdit statement allows the use of a built-in screen editor for editing BASIC program lines. Although you can still use the regular Edit command, I found WEdit much easier to use.

The program features a fully buffered keyboard that allows you to type ahead of the display — even when inserting text. You can also enter commands or answers to prompts when the system is busy loading or saving files to disk or printing to the printer. The buffer will hold up to 48 characters, including ENTER. (Remember, this is Disk BASIC.)

The program's large number of programmable function keys can be used for anything from complex command sequences to a single word or phrase, all at the touch of a key. *Window Master* automatically loads a set of function keys when it starts up, all of which can be changed, deleted, loaded or saved. So you can save your own customized function key set.



You can display up to 212 characters per line, in eight different character-enhancement modes — bold, italic, underline, double width and height, quad width, super and subscript, and regular characters. Any of these features can be selected at any time, and more than one feature can be enabled at the same time. In addition, the program has a built-in graphics character font for printing special symbols. The system includes several printer drivers and allows the user to print either the current window or the entire screen.

Window Master comes with over 30 pages of understandable documentation. With the information provided, I was able to produce a program utilizing eight windows on my screen. In fact, I was so fascinated that I wrote several programs. The system is a delight to use!

Cer-Comp, Certainly

Surprisingly enough, Cer-Comp was formed before the Color Computer was ever produced. Bill Vergona, owner of Cer-Comp, began programming software for other 6800 and 6809 computers. When the Color Computer was introduced, Vergona immediately saw this new computer's power and directed Cer-Comp toward this remarkable new machine. Cer-Comp began producing new software for the Color Computer — introducing *Hi-Res II*, *Textpro III*, *Data Pack II* and *CBASIC*, all powerful machine language programs.

These Cer-Comp programs supplied the CoCo user with many needed features that Tandy had not included. *Hi-Res II Screen Utility* gave the CoCo user a high-resolution screen capable of displaying up to 255 characters per line, true lowercase, mixed text and graphics, auto key repeat and an `ON ERROR GOTO` function.

When Tandy announced another new computer, the CoCo 3, Vergona directed Cer-Comp toward this new, more powerful, Color Computer. Some of the new software reflected earlier work by Cer-Comp. The old favorites were modified and enhanced to fully use the power of the CoCo 3. However, Cer-Comp does more than updating established software. It produces *Window Master*, a powerful new software package for the CoCo 3 that pushes the machine's hardware far beyond its normal capabilities.

Cer-Comp takes great pride in the technically oriented software it offers its customers. Vergona loves to make the CoCo 3 do more than the expected. Programs like *CBASIC III* and *Window Master* do just that. Both systems were expensive projects for Cer-Comp — each requiring more than a year to produce. But Vergona feels it's all worthwhile. Indeed, he says that "*Window Master* is the greatest thing since sliced bread."

The people at Cer-Comp pledge to continue on a technically oriented path; they enjoy stretching the Color Computer 3's hardware capability, and making the impossible possible. ☐

The Power Within *Window Master*

Window Master has an extensive set of commands, which are an extension of the original Extended Disk BASIC commands. I was impressed with some of these powerful statements, and I would like to give you a preview of some of the functions offered by this system.

The Window Open statement creates an output window of a specified type and size on the screen. It will automatically become the current active window. You have the option of creating either a centered or uncentered title. In contrast, the Window Close statement removes a specified window from the screen. However, all the information contained in the window is saved and can be re-displayed later.

The Window Active statement makes a specified window currently active. If this window is hidden beneath another, *Window Master* will rearrange the window layers to bring your specified window to the screen.

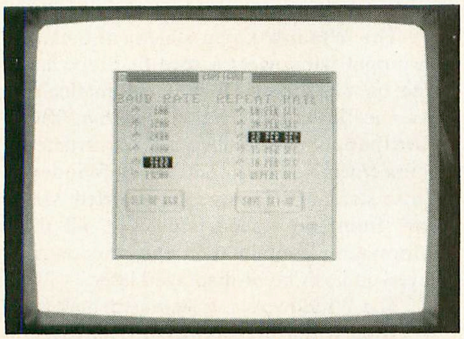
You use the Window Button statement to display one of the various types of buttons on the active window along with text next to the button. (The buttons allow the user to define various screen areas.) The Window Button Close statement removes a specified button from the display.

While Window Icon statements let you display an icon image in your current window, Window Attr statements are used to choose how graphic data will be placed in the window. Disk BASIC allows the use of a copy function, which automatically replaces any existing data on the screen. This window statement lets you select three alternative ways to put the data on the screen.

Using the Window Color statement, you can change colors after a window has been opened. Buttons, icons and text are displayed in the current text color. Edit field boxes are displayed in the current border color.

These are just a few of the commands available for manipulating the windows in the programs you develop, just a brief glimpse of the options available. *Window Master* also has an extensive command list for manipulating the mouse, keyboard, menus and much more. It is up to you and your imagination to test the limitations of this system. ☐

Window Master comes on a *somewhat* copy-protected disk. You can make backup copies with the `BACKUP` command, but the backup isn't bootable. You must boot up with the original disk and then replace the original with your backup. If the original disk is damaged within a year of the purchase date, it will be replaced free of charge. The program disk comes with many demonstration programs, like a calendar program, an MGE graphics viewer and a graphics editor. Cer-Comp promises more in the future. The company is also producing an advanced programming guide designed for *Window Master* users, and the company would like to hear from those of you using this product. If you produce some great software with *Window Master*, Cer-Comp might want to make you an offer.



The program has made Disk Extended BASIC very powerful. *Window Master* is reasonably priced and (dare I say it?) offers so many features that it is probably underpriced. I recommend this software to all CoCo 3 owners.

(Cer-Comp, Ltd., 5566 Ricochet Ave., Las Vegas, NV 89110, 702-452-0632; $69.95 plus $3 S/H)

— Brian R. Smith

Software

CoCo 3

MacPlay— Can You Hear It?

MacPlay is a machine language, disk-based utility that allows the CoCo 3 to play digitized *MacSound* files, which are found on most Macintosh BBSs as well as CompuServe and Delphi. *MacPlay* requires a 128K or 512K CoCo 3 and one disk drive. You will need a 512K CoCo 3 to take advantage of some of the larger digitized sound files. Although a modem with related communications software is required to download *MacSound* files, you don't need a modem to listen to the files. The sounds are played through the monitor speaker via the CoCo 3's output jack.

MacPlay comes on two disks. The first disk contains the program and several sample *MacSound* files; the second contains additional sample files. *MacPlay* runs under Disk BASIC, and the manufacturer says it will run on any of the Disk BASIC-compatible operating systems. *MacPlay* is not copy-protected, so you should make copies of the original disks and work from the backup copies.

When you boot the program, you'll see a single menu that presents a list of options, which are selected by pressing the corresponding number key. In the default drive, the Directory option lets you view the program files, and the Load option allows you to load a file and then view it. Another option lets you load files into memory sequentially and then play them in the order they were loaded. The speed at which sounds are played is controlled via a set of values (one to 32), which are selected using the left and right arrow keys. A final Quit option lets you quit the program and return to Disk BASIC.

The sample files included with *MacPlay* are actual digitized sound files created originally for the Macintosh computer. If you download additional files from a BBS, no file conversion is necessary. However, each file should be given the extension `.MAS`, or the program will not recognize it. In addition, *MacPlay* cannot play archived or compressed files.

While the duration of a digitized sound varies according to file size and playing speed, each of the sample files included lasts between one and five seconds. Having never heard the CoCo produce digitized sound, I was surprised by the high quality of the sound files. To CoCo users who have heard only the buzzes and squeaks available from BASIC, *MacPlay* will make the files sound like records played on a phonograph. The sample files include the Roadrunner's famous "meep-meep," the final bars of the theme song from *The Three Stooges*, the opening trumpet call of *F-Troop* as well as assorted spoken words and sentences. Each file was realistic. (I even expected to see the Roadrunner race up behind me.)

The program makes no provisions for recording your own sound files, nor can *MacSound* files be played or manipulated by any other CoCo sound digitizer.

Overall, I was impressed by the program's convenience. The menu is straightforward and works logically. I liked the ability to make menu selections with a single keystroke. However, the Load and Directory commands are somewhat limited: You cannot load a *MacSound* file while viewing the file directory. In order to load a file, you must return to the main menu — losing the directory. Therefore, you must either memorize or write down the names of the files you want to load. In addition, you can access only one disk drive while using the program.

These are minor faults for a program that gives the CoCo Community a whole new world of digitized sound. One of the biggest difficulties faced by computer users today is communication between different systems; *MacPlay* is helping to unite our community. If you would like to hear what Macintosh users have been hearing, *MacPlay* is for you.

(CoCoTech, 208 Cathy Ann Drive, Reading, PA 19606, 215-779-7768; $19.95: First product review for this company appearing in THE RAINBOW.)

— Walter Myers

Book

Pokes, Peeks 'n Execs— A Series of Helpful Hints and Tips

Do you remember looking through the programs and articles in THE RAINBOW and wondering where all those intriguing peeks, pokes and execs came from? Do you jot down interesting CoCo tidbits for later use but want some way to organize that information? Have you always wanted to *really* stretch the power of your CoCo?

If the answer to any one of these questions is yes, you should look at the *Pokes, Peeks 'n Execs* series sold by Microcom Software. This series consists of three 8 1/2-by-5 1/2-inch soft-cover booklets, containing more than 1,000 peeks, pokes and execs.

Each of the books is organized into general sections, dealing with disks, printers, cassettes, 64K-mode operation, etc. After each command is presented, comments are given about its use and result. The format is clear, easy-to-follow and concise enough not to slow down the more experienced user.

These books can improve your programming skills by giving you access to many functions normally unavailable. The information can be used straight from the books to increase the power and flexibility of your computer. In addition, this wealth of information is available in one organized source, which will be appreciated by both novice and expert.

The first book in the series, *500 Pokes, Peeks 'n Execs* for the TRS-80 Color Computer, contains a wide range of commands, including those for disabling keys or commands, determining either computer memory size or the type of BASIC used, etc. The book also contains utilities, like key-beep, reset protection and recovering a BASIC program after the command `NEW`.

The second book, *Supplement to 500 Pokes, Peeks 'n Execs* for the TRS-80 Color Computer, offers 500 more useful commands and utilities, including some for text and graphics dumps, and has fixes for a few bugs. The book includes some modifications for a few well-known programs and shows you how to get extra lives in some of your favorite games. In addition, it includes a section describing changes to make some of the commands in the book work on the CoCo 3.

The final book in the series, *300 Pokes, Peeks 'n Execs* for the CoCo 3, has some excellent information for the CoCo 3 that I have already put to use. The book includes information on changing border colors, memory management registers, true lowercase, fixes for CoCo 3 bugs, etc.

I was impressed with the accuracy of all three books and found very few errors in the command lines. I did notice that a few peeks and pokes found their way into more than one book, but that was a rarity.

The information found in these books is valuable. I have seen programs based solely on one or two of these peeks and pokes. Imagine what you could do with the entire series at your fingertips.

(Microcom Software, 2900 Monroe Ave., Rochester, NY 14618, 800-654-5244; $19.95 for first book; $16.95 for second; $9.95 for third; $39.95 for set, $3 S/H)

— Michael G. Toepke

Software

CoCo 1, 2 & 3

MAESTRO— The Complete Disk Manager

MAESTRO is advertised as "the complete disk manager for the Tandy Color Computer System." The utility will work on any 32K CoCo with at least one disk drive and Disk BASIC. The program is written in BASIC, so there are no problems with making backup copies for your own protection. The BASIC listing also makes it easy to study the author's work and make changes or modifications as you want. *MAESTRO* is easy to use, even for non-programmers. With it, I was able to modify a number of disk programs and even fix some that crash on me.

MAESTRO is easy to load. The directory contains both the main program and two loaders: one for the CoCos 1 and 2, and another for the CoCo 3. To bring up the Hi-Res screen, just type `RUN "COCO 3"` and press ENTER. From that point, the actual editor screen can be invoked by pressing any key.

The disk index is shown in the upper third of the editor screen. This section of the screen displays the contents of the disk being edited. In the middle of the disk index area, three numbers representing the disk drive, track and sector are displayed. A block to the right of these numbers contains the decimal and Hex values of the byte at the cursor location. The bottom half of the screen, the command window, is used to display various messages for the 32 commands available with *MAESTRO*. The following commands are performed by pressing the appropriate key in conjunction with the CLEAR key:

ARIZONA SMALL COMPUTER PERIPHERALS
930 W. 23rd St. Suite 26
Tempe Az. 85282
(602)-829-8028
M-F 8:00am - 6:00pm MST

1) HARD DRIVES
A. Complete 20Meg System........................$350.00
System consists of 20Meg CMI hard drive, WD1002-SHD controller, DISTO HD INTERFACE power supply, case and all necessary cables ready to plug into MULTI-PAK INTERFACE and run. Drive is formatted with OS9 and has 1Meg+ public domain software.
B. KITS FOR HACKERS
1. 5Meg..$120.00
2. 8Meg..$140.00
3. 10Meg.......................................$160.00
Kits include a CMI hard drive, WD1002-SHD SASI controller, power supply and necessary cables.
C. DISTO HD INTERFACE (when ordered with kit).$50.00

2) GRAPHICS
A. SOFTWARE ie: RAT, COCOMAX III MAX 10
B. DIGITIZER DS-69 and C-SEE 3.3..................$99.95
DS-69B and C-SEE 3.3..................$149.95
C. COMPLETE SYSTEM w/CAMERA.....................C A L L

3) FLOPPY DRIVES
A. 40 track DSDD NEW............................$75.00
B. Reconditioned and tested.............DSDD.......$60.00
SSDD.......$40.00

4) MEMORY UPGRADES
A. 512K upgrade for COCO III (installed only)......$160.00
You ship your computer to us UPS 2nd Day Air We do the upgrade, test it and return it to you by UPS 2nd Day Air. Total time 1 WEEK

5) MODEMS 1200/300 BAUD..............................$40.00
Lowest price to get into Tele-Communications 300/1200 baud Auto answer w/software

6) COMPLETE LINE OF DISTO PRODUCTS

7) OS9 DRIVERS AND DESCRIPTORS INSTALLED ON YOUR BOOT DISK
A service to our customers that enables them to start using their new devices as soon as the receive them.

8) COLOR COMPUTER AND PERIPHERAL REPAIR
We have complete repair facilities including a class 100 clean area for repair of hard drives, a hard drive diagnostic tester, floppy drive test station and a technical staff with over 100 years experience.

9) WARRANTY
All product is sold with a 180 day repair/replacement warranty

MUTANT MINERS
Battle mutant uranium miners in a run for your life, action-packed, arcade style game. 10 levels with 10 screens per level!
100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

BURIED BUXX
Fly your helicopter into enemy territory, dig up the loot and return to base. Watch out for the ever-present patrol aircraft and ground based missiles.
100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

MILESTONES
Use hazards and safety techniques to outsmart the computer in this long-distance road rally simulation. Attempt to be the first to complete a 1,000 mile race. Joystick or keyboard. 100% BASIC. (CoCo 3 only) $19.95

FONTGEN
Using the HIRES graphics modes (HSCREENS 1-4) create standard, medium and LARGE sized fonts, borders and unique icons. Use up to 4 fonts in BASIC!! Also customize palette colors. All supporting software provided.
100% Machine Language (CoCo 3 only) $24.95

DISKEASE
COPY, KILL and RENAME multiple files with one keystroke! Backup and restore directories. Print a directory map. Use maps to reconstruct damaged directories. BASIC/Machine Language hybrid. (CoCo 3 only) $24.95

PICTURE PUZZLES
The ultimate in puzzledom. The computer scrambles 'em and you gotta put 'em back together. 10 puzzles with varying degrees of difficulty.
100% Machine Language. (CoCo 3 only) $19.95

QUANTUM LEAP
A fast-paced spin off from YAHTZZZ. Six dice and unique roll combinations make for a highly addictive game. 1-4 players. . .joystick or keyboard.
100% Machine Language. (CoCo 3 only) $19.95

JR & JR SOFTSTUFF
P.O. BOX 118, LOMPOC, CA 93438 (805) 735-3889

ORDERS ACCEPTED 24 HOURS A DAY. ALL PROGRAMS ON DISKETTE ONLY.

MONEY ORDERS, CERTIFIED & PERSONAL CHECKS, C.O.D., VISA AND MASTER CARD ACCEPTED. (PERSONAL CHECKS MUST CLEAR BEFORE PRODUCT IS SHIPPED). ALL ORDERS ADD $3.00 SHIPPING. C.O.D. ORDERS $3.00 ADDITIONAL.

YOU CAN USUALLY GET US IN PERSON FROM 5:00 - 9:00 P.M. PST. IF YOU GET THE MACHINE, LEAVE A MESSAGE AND WE WILL CALL BACK AT YOUR CONVENIENCE.

CALL OR WRITE FOR A COMPLETE LIST OF AVAILABLE PROGRAMS.

up arrow Reads the current sector of the following track into the editor.

down arrow Reads the current sector of the preceding track into the editor.

right arrow Reads the following sector of the current track into the editor.

left arrow Reads the preceding sector of the current track into the editor.

@ (Position Cursor) Relocates the cursor to any byte in the sector.

0 (No. of Tracks) Changes the number of tracks to 35, 40 or 80.

A (Change Drive Default) Changes the number of the disk drive accessed for input and output functions (0 to 3).

B (Toggle Background Color) Switches between green and buff.

C (Copy Sector) Writes the contents of the editor to the specified track and sector.

D (Decimal Mode) Allows you to enter a three-digit number. One- or two-digit numbers must be preceded by a 0 or followed by spaces.

E (Exit) Returns to BASIC.

F (Read File) Reads the first sector of a specified file into the editor.

G (Clear Buffer) Erases the decimal or hexadecimal number in memory.

H (Hexadecimal Mode) Allows you to enter a two-digit Hex number. One-digit numbers must be preceded by a 0 or followed by a space.

I (Disk Directory) Displays the disk directory.

J (Toggle Inverse Display) Reverses the current foreground and background colors.

K (Kill File) Kills a file on disk.

L (Encode MSB/LSB) Translates a number into most significant byte/least significant byte code.

M (Fill Sector) Fills the sector with any character you specify.

N (Normal Mode) Allows direct input from the keyboard.

O (Decode MSB/LSB) Translates a most significant byte/least significant byte code into a decimal number.

P (Search Disk) Searches each half-sector on the disk for a given target string.

Q (Current Granule) Displays the current granule.

R (Rename File) Renames a file on disk.

S (Read Sector) Reads the sector of the track you designate into the editor.

T (Trace File) Traces a file on the disk after reading it into the editor. You will see the current granule, track and sector of the file.

U (Undo Sector Mods) Restores the original sector by erasing any changes you made.

V (Verify Disk) Makes sure the disk is free of I/O errors.

W (Write Sector) Writes the contents of the editor to the current track and sector.

X (Reinitialize) Restarts the program.

Y (Fill Before Cursor) Fills every byte before and after the cursor with any character you select.

Z (Fill After Cursor) Fills the byte under and after the cursor with any character you select.

I used *MAESTRO* to fix a disk that kept giving me I/O errors. All I had to do was scan the sector containing the I/O Error

7 Color Printer NX-1000 RAINBOW

star micronics

MULTI-FONT PRINTER

NX-1000

NEW

The NX-1000 gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. The NX-1000 Rainbow gives you all these features plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange. Both models have a 1 year warranty, nationwide service and a 30 day online trial.

NX-1000 SPECS: 144 cps Draft, 36 cps NLQ (18 x 23 dot matrix), 4 NLQ Fonts, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable, Quad Tall, Double Tall, Underline, 9+ Pitchs, Forward and Reverse n/216" Line Feeds, Absolute or Relative Vert. & Horz. Tabs, Left, Center or Right Justification, 8 Graphics Modes to 1920 dpl, Macro Instruction, Bidirection, Adjustable Tractor Feed, 200+ Printable Characters, Semi Auto Sheet Feed, Front Panel Soft Touch Control, Epson and IBM Emulate, 4k Data Buffer, Hex Dump. **Rainbow:** Same plus color.

NX-1000 SYSTEM INCLUDES:

- *Star NX-1000 Printer*
- *Blue Streak Ultima*
- *Software Support Trio*

$199.95
+$10 Shipping and Insurance
COMPLETE

NX-1000 RAINBOW SYSTEM INCLUDES:

- *Star NX-1000 Colour Printer*
- *Blue Streak Ultima*
- *Software Trio*
- *Color Super Gemprint*

$284.95
+$10 Shipping and Insurance
COMPLETE

Software Support Trio

TYPE SELECTION/ TUTORIAL
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.

SUPER GEMPRINT
Will transfer a Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

HI-RES SUPER GEMPRINT
Disk software that will transfer a Hscreen 1,2,3 or 4 picture screen to printer. Grey level shading for color.

Software Trio
$19.95
FREE
with purchase of any NX-1000 Printer

Price, availability and specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
9644 QUAILWOOD TRAIL
SPRING VALLEY, OHIO 45370
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 885-5999
Visa & MasterCard
within the continental U.S.

and look for the byte that was out of place. The program's 15-page instruction manual devotes an entire section to this process. Instructions are also provided for *patching*, rather than fixing, a bad sector if you don't understand the sector's contents. In addition, *MAESTRO* can fix FS errors. The program disk contains a utility called *Crash Buster*, which makes an extra copy of the disk directory on an unused track. This utility is simple to use and menu-driven.

MAESTRO is a fine disk repair utility, and its ease of use rates as one of the best I've seen. The program is straightforward; the author treats this usually complicated subject matter with a good deal of practicality. Although not intended for the novice, *MAESTRO* provides the serious CoCo hacker with an excellent tool for programming and debugging. The program supports a printer, so you can make printouts for later reference and filing.

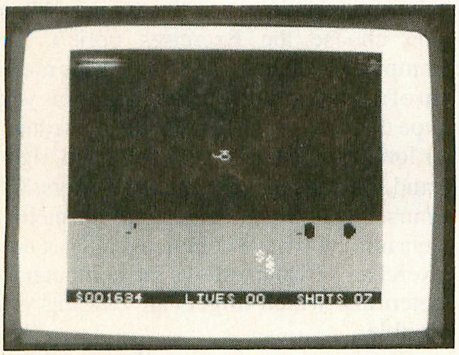
(Marc Campbell Innovations, 266 Riverview Drive, Ephrata, PA 17522, 717-733-2998; $16.95 plus $2 S/H: First product review for this company appearing in THE RAINBOW.)

— Robert Gray

Software CoCo 1, 2 & 3

Buried Buxx—
Digging for Dollars

Buried Buxx is an action, shoot-em-up, machine language game that requires a CoCo with 32K ECB, one disk drive and a joystick. The game runs fine on the CoCo 3, but you will get a black-and-white game screen if you use an RGB monitor. On the CoCo 3, the screens look best on a composite color monitor.



The game is simple to load; just type `LOADM "BUXX"`, press ENTER and then enter `EXEC`. You will be greeted with the title screen, which includes a color test. Press the reset button on the back of the CoCo until the test blocks are the correct color.

To play the game, use a joystick to maneuver a small helicopter over buried dollar signs ($). You must shoot holes into the ground and descend into the holes to retrieve the dollar signs. At the same time, you must avoid the bombs dropped by the ever-present airplane above you. The bombs will also fill the holes you have blasted. To make matters worse, there are missiles hidden beneath the ground, and if you uncover them while shooting, you must move quickly to avoid destruction.

Once you have successfully captured a dollar sign, you must fly to the landing pad on the left side of the screen and land. A tone indicating that you have off-loaded the dollar sign will sound, and you can continue your search for the buried dollar signs. Don't get greedy and try to carry more than one dollar sign at a time — your helicopter will explode.

Once you have retrieved all the buried dollar signs, you will advance to the next screen. At each new level, an additional dollar sign is added. (By the way, the number of dollar signs is equal to the number of hidden missiles.)

Each dollar sign you deliver to the landing pad is worth $2,000. Your score is shown at the bottom left of the screen, and the number of remaining helicopters is displayed at the bottom center of the screen. For every 20,000 points you earn, you get an extra helicopter. Helicopters get 25 rounds of ammunition, and extra ammunition is available at the landing pad. However, you lose 10 points every time you fire, so it's wise to conserve that ammo. Your ammunition count is displayed at the bottom right of the screen.

The Ultimate Serial to Parallel Converter!

7 Switchable Baud Rates
300 • 600 • 1200 • 2400 • 4800 • 9600 • 19200

Use this "smart" cable to connect a Centronics parallel printer to any version CoCo or use it to improve performance of your current printer.
Try it on your system for 30 days RISK FREE. One year warranty.

$39.95 +$2 Shipping
4800
2400
9600
1200
19200
600
300
BLUE STREAK
ULTIMA
SERIAL TO PARALLEL INTERFACE

Color Super Gemprint

Print your Graphics Screens in Color on your NX-1000 Rainbow

Color Screen Dump Software

Use your favorite program to create a pmode or hi-res graphic image, but don't stop there! Run our color graphics software and print a color image using a pallette of 81+ colors on your NX-1000 Rainbow from a CoCo 1, 2, or 3. This system superimposes 4 graphic screen dumps (black, blue, yellow & red). The colors mix and add to give you your own color masterpiece.

System Requirements: 32k ECB Disk, Blue Streak 1, 2, 3 or Ultima

$19.95
FREE with purchase of NX-1000 Rainbow Printer

Price, specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
9644 QUAILWOOD TRAIL
SPRING VALLEY, OHIO 45370
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 885-5999
Visa & MasterCard
within the continental U.S.

Buried Buxx is a lot of fun to play. It has a simple theme but challenges your skills. The disk has a one-year warranty and can be replaced for $5. In addition, the disk is not copy-protected, so you can make backup copies. I would like to see a version available for the CoCo 3 and an RGB monitor, so those users can enjoy the colors and graphics. The game is suitable for all ages, and its tame theme does not promote violence.

(JR & JR Softstuff, P.O. Box 118, Lompoc, CA 93438, 805-735-3889; $19.95: First product review for this company appearing in THE RAINBOW.)

—Jerry Semones

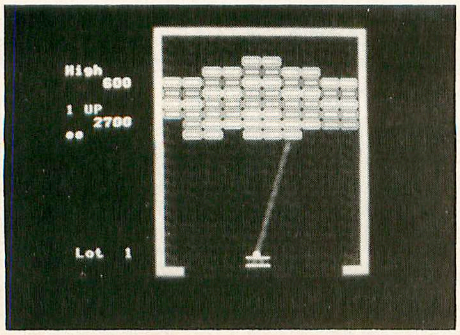
Software

CoCo 3

Bash— Breaking Away

Bash is an action game in which players attempt to clear vacant lots (screens) of debris for the construction of new buildings. To do this, you must move a girder back and forth across the lot in order to bounce a wrecking ball off the debris. If you fail to hit the ball with the girder, the ball is lost and a new one is put into play. When the screen is cleared of debris, the player advances to a more difficult lot. The game is over when a player either successfully clears all 20 lots or exhausts the limited supply of wrecking balls.

My first impression of *Bash* was that it would be another one of those *Breakout*-type games. But I think the author, Steve Bjork, has made it different and more challenging. As in most *Breakout* games, the speed of the ball continues to increase. But in this version, when certain pieces of the debris are hit, treasures are revealed and "fall to the ground."



These treasures must be caught by the girder in order to be collected. Some of the treasures cause the ball to slow down or make the girder wider. Other treasures produce more balls — it can become quite a challenge trying to keep all those extra balls in play. You must learn to catch the treasures with the girder while not losing the wrecking ball.

Bash makes very good use of the colors available on the CoCo 3 and is especially nice on an RGB monitor. This is important because it allows for extended playing time without the video eye-aches. Another feature is one that allows you to choose to start anywhere from Lot 1 to 15. The game's pause feature comes in handy when you're right in the middle of a game and the phone rings!

Bash is essentially bug-free, and all of the action elements are close to real-life movements; e.g., the ball's behavior is realistic as demonstrated by the way it bounces off the objects on the screen. The game was very enjoyable and worthwhile to play.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; $24.95 plus $3 S/H; $4.95 for demo disk)

—Christopher Dollberg

Software

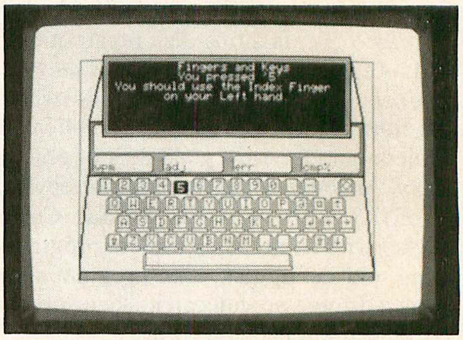
CoCo 1, 2 & 3

TypeMate— Teach Your Fingers More Than Walking

Speed is a major concern of many computer users. We spend hundreds of dollars on utilities like RAM disk programs to speed up our computing. We listen with interest as software publishers brag about the lightning speed of their programs. Even with RAM disks, hard disks and faster microprocessors, our computing is still often slowed down by the slowest and often forgotten component — the operator. Using a word processor with a RAM disk and print spooler is great, but it leaves something to be desired if the person sitting in front of the computer is still typing manuscripts by the hunt-and-peck method.

A recent search through THE RAINBOW showed only one typing tutor program for sale. It seems that keyboarding skills have been neglected by CoCo programmers. Tandy, however, is attempting to rectify this situation by releasing a new program pack intended to teach typing skills — *TypeMate*, which will work with any CoCo 1, 2 or 3 that has at least 32K of memory. No other equipment is necessary; a printer and cassette recorder, however, are optional.

It doesn't take long to learn how to use *TypeMate*. Simple menus guide users through the program. Selections are made by pressing the up and down arrow keys followed by the ENTER key. The BREAK key is always used to escape from one level of the program back to the previous one. The opening menu is called "What shall we do?" and contains five selections: Fingers and Keys, Exercises, Lessons, Graphs, and Controls.



```
Fingers and Keys
You pressed '5'
You should use the Index Finger
on your Left hand
```

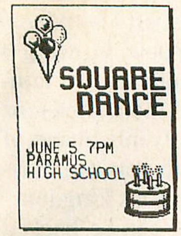
The first thing people must learn about keyboarding is how to place their fingers on the keyboard and which finger to use for each key. *TypeMate* is not a conventional, full-fledged typing tutorial: It does not contain lessons that begin with the home-row keys (A through L) and then continue on to the more exotic keys. It *does* have a chart in the back of its simple but adequate 28-page manual that shows you where to place your fingers. From there you must learn how each key works by selecting the Fingers and Keys option on the menu.

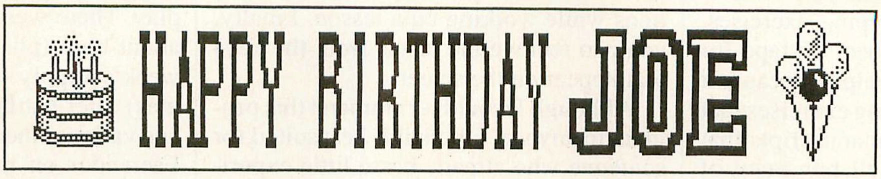
Fingers and Keys prompts you to press any key. When you do, the computer tells you which key you have pressed and which finger or combination of fingers should be used to make that key press. The accompanying manual provides a suggested plan for going through each key press in order to learn them.

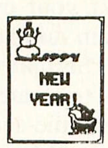
The Exercises and Lessons options are useful and similar to each other. Here is where you begin to practice typing. When you choose the Exercises option, the computer produces random lessons made up of nonsense words and times you as you type them. You can choose short, medium or long exercises for your left hand, right hand, both hands or problem fingers. Of course, you cannot choose problem fingers until you have completed at least one exercise — which allows the computer to determine which fingers are causing you trouble.

As you type, your words per minute (wpm), number of errors, adjusted wpm and the percentage of the exercise completed are shown onscreen. It is tempting to look at these displays as you type, but this only slows you down. Whenever you

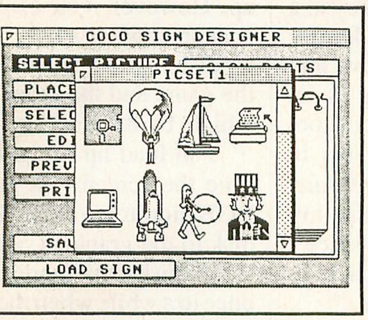
The Coco Graphics Designer Plus $29.95


SQUARE DANCE
JUNE 5 7PM
PARAMUS
HIGH SCHOOL


HAPPY BIRTHDAY JOE


HAPPY
NEW
YEAR!

Makes Signs, Banners, Greeting Cards


COCO SIGN DESIGNER
SELECT PICTURE
SIGN PARTS
PICSET1
PLACE
SELEC
EDI
PREV
PRI
SAV
LOAD SIGN

Super easy-to-use point and click graphical interface, features windows, scroll bars, radio buttons, and joystick or mouse control.

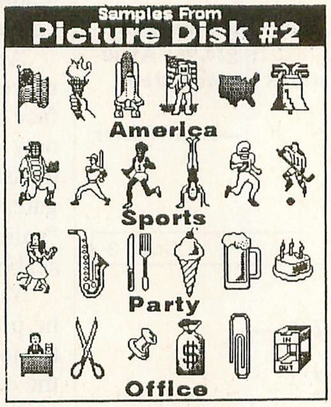
The CoCo Graphics Designer Plus (CGDP) is CoCo 2 and 3 Compatible. It allows pictures, and text in up to 4 sizes and 16 fonts, per page or banner. The cards & signs feature hi-resolution borders and complete on-screen previews. The CGDP comes with 16 borders, 5 fonts, and 32 pictures. It's 100% machine language for fast execution.

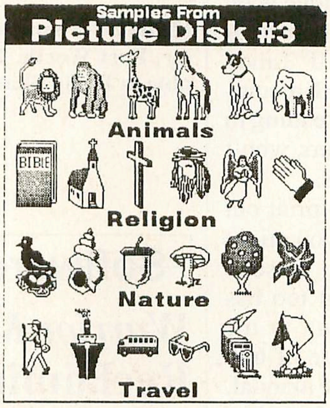
Printer Support Radio Shack DMP105, 106, 110,120, 130, 132, 200, 400, 420, 430, 440, 500, Epson FX/RX/LX/EX, LQ, Star 10X, SG10, NX10, NX1000, Panasonic KXP1080, 1090, 1091, 1092, Prowriter, C. Itoh 8510 & more.. Call for complete list.

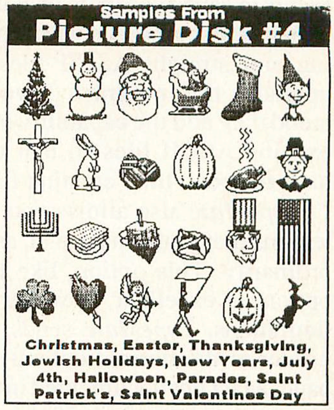
Requirements: 64K CoCo II or III, disk drive with RSDOS, mouse or joystick.

Picture Disks Now
CoCo MAX
& MAX-10
Compatible

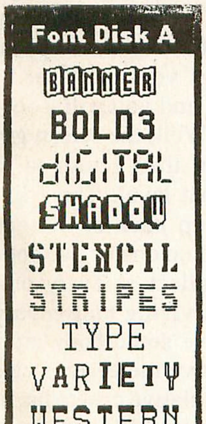
In response to the many requests we received, our picture disks now include a simple format conversion utility making them easy to use with Colorware's MAX-10 and CoCo MAX II and III.

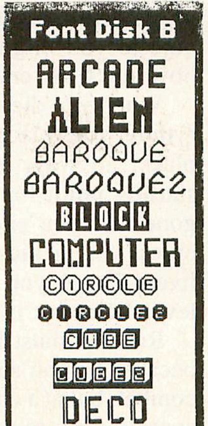

Samples From
Picture Disk #2
America
Sports
Party
Office


Samples From
Picture Disk #3
Animals
BIBLE
Religion
Nature
Travel


Samples From
Picture Disk #4
Christmas, Easter, Thanksgiving, Jewish Holidays, New Years, July 4th, Halloween, Parades, Saint Patrick's, Saint Valentines Day

These two optional font collections supplement the fonts built into the CGDP.
Font Disk A 10 fonts $14.95
Font Disk B 10 fonts $14.95


Font Disk A
BANNER
BOLD3
DIGITAL
SHADOW
STENCIL
STRIPES
TYPE
VARIETY
WESTERN


Font Disk B
ARCADE
ALIEN
BAROQUE
BAROQUE2
BLOCK
COMPUTER
CIRCLE
CIRCLES
CUBE
CUBES
DECO
GRAY
SCRIPT
SCRIPT2

GREAT COCO CLIP-ART! disks 2, 3, and 4, supplement the pictures that come with the CGDP. Each disk has 120 pictures arranged by subject. A few samples are shown above. Besides being compatible with Zebra's CGD and CGDP, each disk contains a utility to easily transform our pictures into CoCo Max pages, CoCo Max II clip book pages, CoCo Max III scrap books, and Max-10 clip art files. Order your picture disks today and use our great clip art with your favorite graphics programs!

Zebra's Picture disks 2, 3, and 4 are priced at $14.95 each.

UPGRADE POLICY (GOOD TILL FEBRUARY 28, 1989)

CGD to CGDP Upgrade: Send $20 (check, or credit card authorization, no COD's), with your original serial numbered CGD disk in any envelope - (we don't care if the disk gets bent). We'll send you the new CGDP. Remember to keep a backup CGD copy for your continued use, and that the CGDP requires a mouse or joystick. Also make sure the new CGDP supports your printer! For example, the CGP220 is not supported. Call if in doubt.

Picture Disk Upgrade: If you want to use your early picture disks 2, 3, and 4 with the Colorware products mentioned above, return your original serial numbered disks with $5.00 per disk and include our standard $3 per order shipping & handling charge. We'll send you the latest version of your picture disks, including new manuals and a set of 15 special labels to make working CGD, CGDP, CoCo Max, II, III and Max-10 picture disks.

CALL OR WRITE FOR OUR FREE COCO PRODUCTS CATALOG!

Ordering Instructions: All orders add $3.00 Shipping & Handling. UPS COD add $3.00. VISA/MC Accepted. NY residents add sales tax.

Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421 (718) 296-2385 make a mistake, the computer beeps. If you find this annoying, as I did, simply turn down the volume on your monitor.

The Lessons option allows you to create and edit your own typing exercises, execute them and save them on tape for future use. This option is helpful because it enables you to create typing exercises that are more like the actual manuscripts that you type in real life. After all, how many of us find ourselves typing such phrases as "zzyk lper syncu." You will find that your typing speed will be much better when typing actual English words.

There are some limitations when using a cassette recorder. First, all lessons that you create are saved under the same filename, `TYPEMATE`. You cannot give them filenames of your own. Second, I was hoping I would be able to load in manuscripts that I had prepared previously on a word processor. Although I tried many times, I couldn't do it. *TypeMate* seems to save files in its own unique way, which is incompatible with word processing and straight ASCII files. If Tandy upgrades this program, I would recommend they add the capability of reading in existing ASCII files so that users won't have to spend time creating files.

TypeMate also allows you to print out lessons that you can type in, as you might ordinarily. This option, like the cassette option, is excellent; however, it too has limitations. *TypeMate* sends data to the printer at the normal default rate of 600 baud, a fact not documented in the manual. I have my printer set at 4800 baud and had to reset the DIP switches before printing my lesson. Also, *TypeMate* does not allow you to format your lesson before your print it out. Spaces and margins will have to be put into your document as you type it.

It is possible to transfer the program from pack to tape so that you can change the baud rate before executing the program. This, however, is probably not worth the effort. If you should do it, you may have problems getting *TypeMate* to run from tape.

It is essential to have feedback when learning typing skills. This is where *TypeMate* really shines. Not only does it keep track of your speed and errors, it also illustrates those errors with bar charts. The Graphics option will illustrate your errors by hand and finger, and by keyboard character. Once you know what fingers and keys are giving you trouble, you can give them special attention.

The final option on the main menu is called Controls, and it allows you to change the color of your screen from black on white (with artifact red and blue) to dark green on light green. You can also change from typewriter to word processor mode, which simply means you won't have to use carriage returns at the end of lines, and you can use the backspace key to make corrections while working on a lesson. Finally, you can remove the labels from the keys that appear on the screen.

Although I would recommend this program to anyone, I think it is best suited for someone who already has a little experience with the keyboard. A person who has no keyboarding skills might need a step-by-step tutorial that works on one key at a time. However, for anyone who knows some of the keyboard but is slow and makes a lot of errors, *TypeMate* is an excellent tool. It is also an excellent tool for a good typist who simply wants to increase speed. I enjoyed using *TypeMate*, and it was comforting to find out that my typing skills have not diminished since I took a personal typing course back in 1973.

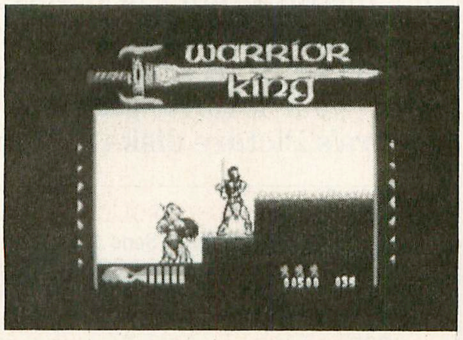
(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $24.95: Available in Radio Shack stores nationwide.)

—Dan Weaver

Software CoCo 3

Warrior King— Reclaiming a Kingdom

Rastann is alone. His armies have deserted him. Only his sword, his bravery and his wits can save his life and his kingdom.



The kingdom, Aqualone, is properly named because there is a lot of water in *Warrior King*, Sundog Systems' latest cardiac-arrest game for the CoCo 3. At times I felt as if I were back on the golf course, what with all the water hazards facing me as Rastann's controller. Fortunately for golfers, there aren't any pits filled with molten lava on the greens as there are in this game.

You need a good joystick, 128 or 512K and a disk drive — plus a strong heart and maybe a goodly supply of deodorant — to play. There were times when I wondered about both (plus the wisdom of using a week's supply of adrenalin in five minutes) after battling lizard-men, skeletons and various other unfriendly inhabitants of Faerendor on my way to retrieve Rastann's crown and thus save his kingdom.

The double-sided disk can be backed up. However, you cannot play from the backup copy; it's only to restore the regular disk in case you goof it up. One side is the game and the other side the graphics, which, by the way, are excellent.

You load up the game disk, at which time the screen will ask if you have an RGB monitor. You're then told to *flip the* disk to the graphics side.

My disk drive made little squeaks every once in a while when the graphics disk was loading, but it was nothing to worry about. Leave the graphics disk in the drive.

At the beginning you see an elaborately carved gate with a sword over it (is there a face at the base of the blade or do I need new glasses?). You begin the game by pressing the joystick firebutton; as the gates slide back, you hear the sinister "sniiick" of a sword being drawn from its scabbard.

You then see a side view of Rastann as he proceeds on his perilous quest. Using the joystick and its firebutton, you slash at the enemy (while the computer produces realistic metal-on-metal noises), climb ropes, jump hazards and pick up helpful items. This is not easy, because you are also facing a time limit for each level you have to pass through. Thus, you can't be mucking about slicing up foes instead of getting on with it. The screen advises you of how much time you have left, any objects you might have picked up, and how much life energy you still have.

When you die — and you will — everything goes black. Well, the screen goes black, anyway. You then return to the starting point for that level. Three lives gone and you end up back at the gate, unless you've picked up one or two bonus lives. Those you collect at every other level. The trick is surviving long enough.

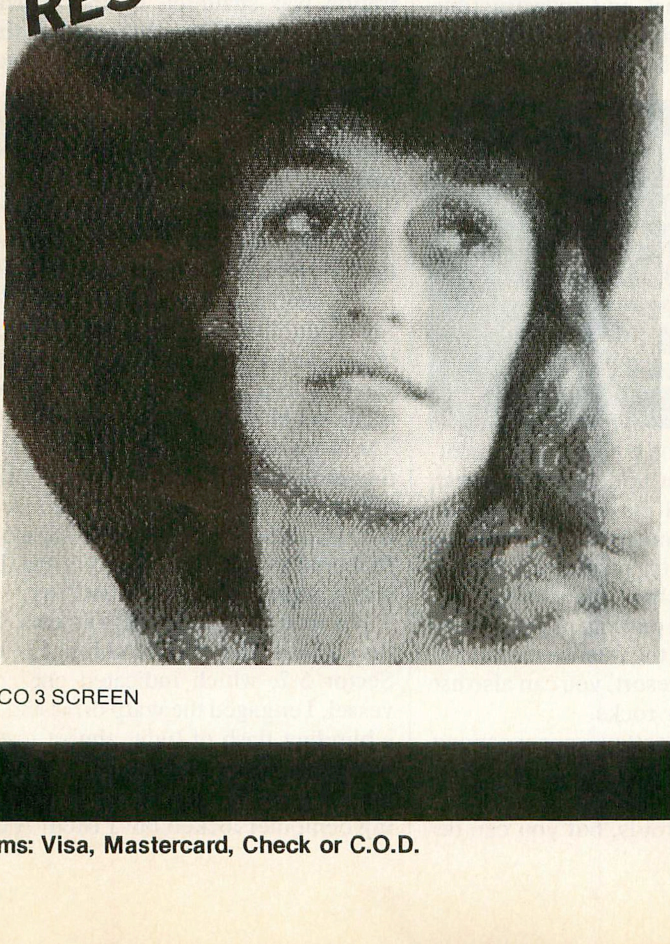
Rastann must have some body armor because he can survive melee-type close combat, but at a cumulative cost to his life energy. Unfortunately, this same armor gives him the swimming ability of a depth charge, so stay out of the water and the lava. The best thing is to slash the opponent, kneeling if you have to in order to get under his sword — and get moving.

Like a lot of good advice, it wasn't that

DIGISECTOR DS-69B NEW VIDEO DIGITIZER FOR THE COCO 3

(AND ALL OTHER COCOS . . .)

SUPER RESOLUTION !!!



COCO 3 SCREEN

USE YOUR COCO 3 TO ITS FULL POTENTIAL!
Use The Micro Works' DIGISECTOR™ DS-69 or DS-69B and your COCO 3's high resolution graphics to capture and display television pictures from your VCR or video camera. The DIGISECTOR™ systems are the only COCO video digitizers available that accurately capture and reproduce the subtle shades of gray in TV pictures!

- **COLOR:** Add color to your screen for dramatic special effects.
- **HIGH RESOLUTION:** 256 by 256 spatial resolution.
- **PRECISION:** 64 levels of grey scale.
- **SPEED!** 8 images per second on DS-69B, 2 images per second DS-69.
- **COMPACTNESS:** Self contained in a plug-in Rompack.
- **EASY TO USE:** Software on disk will get you up and running fast!
- **COMPATIBLE:** Use with a black and white or color camera, a VCR or tuner.
- **INEXPENSIVE:** Our low price puts this within everyone's reach.

POWERFUL C-SEE 3.3 SOFTWARE

This menu-driven software will provide 5 and 16 shades of gray to the screen and to the printer with simple joystick control of brightness and contrast. Pictures taken by the DIGISECTOR™ may be saved on disk by C-SEE 3.3 and then edited by our optional MAGIGRAPH, or by COCO MAX or GRAPHICOM. This versatile new software is included in both DIGISECTORS™

DS-69B and C-SEE 3.3	**$149.95**
DS-69 and C-SEE 3.3	**$ 99.95**

TRADE IN YOUR OLD DIGISECTOR™
If you already have one of The Micro Works' DS-69 or DS-69A DIGISECTORS™, you may return it to us and we will upgrade your unit to a DS-69B.

UPGRADE DS-69A to DS-69B	**$49.95**
UPGRADE DS-69 to DS-69B	**$69.95**

The DS-69B comes with a one year warranty. Cameras and other accessories are available from The Micro Works. DS-88 version available for IBM PC.

NO RISK GUARANTEE
If you are not completely satisfied with the performance of your new DS-69B, you may return it, undamaged, within ten days for a full refund of the purchase price. We'll even pay the return shipping. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like. We know which one you'll keep.

THE MICRO WORKS

Purveyors of Fine Video Digitizers Since 1977.

Terms: Visa, Mastercard, Check or C.O.D.

P.O. Box 1110 Del Mar, CA 92014 (619) 942-2400

easy to follow. After drowning often, I called Glen Dahlgren, the wizard who programmed *Warrior King*. He gave me some good advice, which was easy to follow. Swing the sword before jumping, because sometimes you will push the joystick through another command area on the way to the upper-right corner to produce a jump. This hint saved me from the previous embarrassment of watching my hero look like an armored hopscotch player, having just made a 6-inch jump straight into the water.

Another hint was to ease up to the edge of where you want to jump from by tapping the joystick. "Ease" and "tap" are the right words; more than once Rastann had eased his way right into the water thanks to my trying to gently move the joystick instead of tapping it.

Another thing to remember is that you can't move forward or backward when swinging the sword. This is important because if you're flailing away at an enemy while standing on his toes, you're not getting away from him and you're not going to kill him, either. In the meantime, he'll be turning you into self-propelled hash.

The instructions for this electronic mayhem are clear, concise, easy-to-follow and well-made. Sundog Systems has already produced a modified version of the instructions, which are much classier than the original. In addition, Glen Dahlgren said that he'd eliminated a gremlin that appeared about once in every 1,000 games.

Don't laugh. If you were to keep track, 1,000 games would happen sooner than you think. There is an obsessive tendency to try just one more time before going to bed, to work or to dinner.

My only suggestion might be to make things just a little easier at the beginning so you can get used to the way things work. You may spend a lot of time dying while learning the basics. On the other hand, if you apply the above hints, you'll have an easier time than I did before calling for help.

So, if you want something other than mindless blasting of alien spacecraft from the galaxy, and thrive on feeling your heart pound in your chest while your forehead gets damp, have a go at *Warrior King*. What with winter settled in, you can get your exercise swinging a sword/joystick rather than a golf club or bat. You might get to the fabled Crown of Aqualone by spring.

(Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, 412-372-5674; $29.95 plus $2.50 S/H)

—John M. Hebert

Software CoCo 3

Rad Warrior— Life in the Rad Years

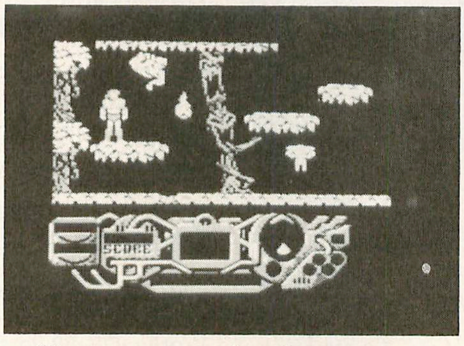
It wasn't always like this. The elders talk of a time before the space invaders attacked, a time of blue skies and green forests. All that is gone now — lost in an alien attack. The remnants of humanity are slaves, mining ore deep in the earth. It *is* the worst of times.

But there is hope. The elders know of weapons that — if found — would destroy the aliens. *You* have been trained from birth to find these weapons and destroy the aliens. You are earth's last hope.

First, insert the *Rad Warrior* ROM pack into your CoCo 3. Select your tools (either an RGB monitor or color television, and either your joystick or keyboard), and face the opening screen. The graphics and animation in this arcade game are excellent.

Begin your quest by searching for the energy suit, which is vital in protecting you from the radiation. The suit also has a control panel, so you can keep tabs on the radiation level, weapon status and other information necessary for your survival.

It's not easy. The enemies appear endless — mutant flies, jugoids and subtains bar your way. Although these creatures are easy to destroy, killing them saps your strength. Acid rain drips from the ceiling of the mines. Lethal and indestructible sloths wait to ambush you in the forest, and hidden hydraulic spikes add to the danger.



Your weapons and equipment are scattered throughout an underground forest, the ruined city and the volcanic rubble. The weapons you must find include the energy suit, gravity displacers, pulsar weapons (used to shoot the enemy), implosion mines and a particle negator (used to protect you from the intense radiation). Of course, as a last resort, you can also use your fists and throw rocks.

Once you have gotten your weapons, you must fight your way through the alien defenses. You will learn that you can't fight the bomber droids, but you can destroy their bombs. You can do nothing against the calibrated gunners and their plasma bolts, so fight around them. Just when you think it can't get worse, it does. Flame dragons attack with fire. Will these aliens stop at nothing?

You must remember your goal: Find the aliens' generator rooms and destroy the central generator. You must not fail. Failure means the eternal enslavement of the human race.

Some day, people will sings songs about your bravery. They will shudder with horror as they tell tales of the Rad time.

(Tandy Corporation, Fort Worth, TX; $29.95: Available in Radio Shack stores nationwide.)

—Thomas M. Taulli

Software CoCo 3

Warp Fighter 3-D— Spacing Out Into the Third Dimension

There she stood, complete with the Federation's newest warp drive and the latest technological advances known to mankind — the *Warp Fighter*. Like an old monument, I stood fixed and motionless, gazing in awe at the splendor of her design and workmanship. Suddenly, my concentration was shattered by the realization that the Akaire were out there, waiting to test the years spent sweating, studying and training at the Academy.

Stepping onto the anti-gravitational boarding platform, I couldn't help but feel insignificant compared to the size and complexity of this technological work of art. I slid into the cockpit and lowered myself down into the custom-fit combat pilot's seat, which was manufactured to fit my body like my own skin. I secured myself so as not to be tossed around like a satellite in a meteor shower. The instrument panel looked cold and uninviting. The monitor was lifeless. Eagerly I donned the advanced 3-D visor and reached for the power switch. As power surged through the electrical veins of the ship, the monitor flickered to life. The sound of the drives was soothing, almost hypnotizing.

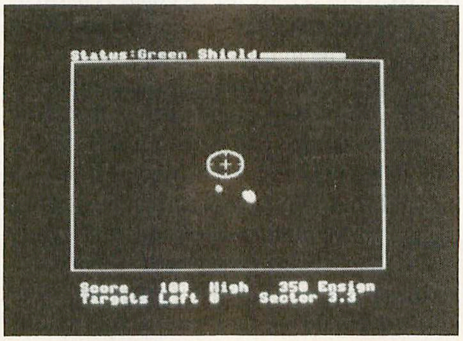
I activated the long-range scanner. There they were! The Akaire ships. I selected Sector 5.2, which indicated one enemy vessel. I engaged the warp drive and, with a blinding flash of light, almost instantly was transported into the heat of battle. I maneuvered into firing position. The tracking computer locked on. I fired! A direct hit! One sector cleared. Consulting the long-range scanner, I drew a deep breath and prepared for another warp.

Warp Fighter 3-D, programmed by Steve Bjork (distributed by Game Point Software), is a three-dimensional graphics space fighter simulation complete with 3-D glasses. It requires a CoCo 3 with at least 128K, a joystick, a disk drive and a monitor. Although a color TV or a composite monitor can be used, an RGB color monitor is preferred for best results.

Operation of *Warp Fighter 3-D* is simple, controlled almost entirely by the joystick. The video display is simple and easy to read, unhampered by confusing, cluttered graphics. The main display, also the largest, is where all the action is. Above it is one line of strategic information and below are three lines of the same. When requested, a sector display will appear to show enemy-held sectors, starbases and your relative position.

The simulation reacted to input as fast as I could act. In order to lock onto an enemy vessel, you must center the cross hairs on the enemy ship. When this is accomplished, the "on-board tracking computer" will stay locked on unless one of several things happens: 1) The enemy ship maneuvers too fast (I found this happening frequently at the higher difficulty levels), 2) The enemy vessel leaves the screen, or 3) The enemy ship is destroyed.

One characteristic that cannot only be annoying but also fatal is the tracking computer's inability to distinguish between asteroids and ships. In the fury of battle, I don't like wasting time shooting asteroids in order to get a shot at the enemy. The tracking computer can't unlock from a target unless the target is destroyed or moves off the screen.



In the middle of play, I heard a beeping/buzzing sound. Once I figured out what it was, it was too late. That sound was a warning that my shields were depleting to a dangerous level. Shield level is compromised by taking hits from enemy fire and running into asteroids. If you notice the condition in time, warping to a sector with a starbase and then docking with it will recharge the shield. However, be warned: Recharging the shields costs expensive points. Also take notice that if the shield level drops to the nonexistent, the simulation is over. This was an aspect of the game that I liked. As long as the shield holds up, the game will continue (unlike some other games that depend on fuel level).

The longer I played, the more I noticed that the increase in difficulty in the highest level is derived not only from an increase in speed but primarily from an increase in enemy ships per sector. There are three difficulty levels: Ensign (easiest), Captain (medium) and Admiral (hardest). I found the Admiral level fairly easy and accomplished it on my second or third try (I don't remember which). Had I the determination and the stamina, I could have played as long as the computer held up. After you reach the level of Admiral, 40 enemy ships (total combined sectors) are all you'll have to fight. The object after mastering the Admiral level is to clear all sectors without having to recharge the shield. In theory, this means that it is possible to achieve a maximum score and not be able to do any better. I'll let you discover the maximum

Conquer the World!

DOMINATION $18
MULTI-PLAYER STRATEGY GAME!
Try to take over the planet of YCNAN. Battle other players armies to take control of their provinces and defend yours. Play on a Hi-res map of the planet. Take the "RISK" and be a planet-lord today!!! Requires 1 disk and joystick or mouse. See Rainbow Review JULY 88

MYDOS $15
EPROMABLE! CUSTOMIZABLE!
MYDOS is an enhancement to Disk Extended Basic 2.1 on the CoCo 3. Screen echo and SAY command for RS Speech Pak. Point and click mouse directory. **NEW FEATURES!** Supports D/S and 40 track drives. Power-up in any screen colors (or monochrome), width, and palettes (RGB or CMP) you wish! **More options than you can shake a joystick at!** See Rainbow Review JUNE 87

HAWKSoft KEYBOARD CABLE $25
UNCHAIN YOUR KEYBOARD!
Five foot extender cable for Coco II and 3. Move your keyboard where you want it! Installation instructions and tips included! Custom lengths available.

HAWKSoft
P.O. Box 7112
Elgin, Il. 60121-7112
312-742-3084
S/H always included
Check COD or MO accepted
Il orders add 7% sales tax

RAINBOW CERTIFICATION SEAL

"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost $15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

"ON A SCALE OF 1 TO 10, I RATE ADOS-3 A SOLID 15." RAINBOW, 7/87
Disk . . . $34.95 Original ADOS for CoCo 1 or 2 . . . $27.95 (See 6/87 RAINBOW review)
Original ADOS plus ADOS-3 . . . .$50.00

THE PEEPER
ML program tracer that multitasks with the target program. An excellent learning tool for the ML novice; an invaluable debugging aid for the expert. CoCo 1, 2, or 3 compatible.
Disk . . . $23.95 Assembler source listing . . . Add $3.00

MONITOR CABLES for CoCo 3
Magnavox 8CM515/8CM505/8CM643 . . . $19.95 Sony KV1311CR . . . $29.95

SPECTROSYSTEMS
11111 N. Kendall Drive,
Suite A108
Miami, Florida 33176
(305) 274-3899 Day or Eve.

No delay on personal checks • Please add $2.00 shipping • Sorry no credit cards or COD's.

score, if it exists, for yourself.

Warp Fighter 3-D has a pause feature (for when Mom calls you to dinner) that changes the screen color every few seconds to help prevent screen burn-in. I like this feature and wish all software had it.

A veteran of several different space fighter simulations, I feel this one has some limitations. But I have enjoyed playing it. *Warp Fighter 3-D* is easy to play, which allows younger children to participate and does not require memorizing a lot of keyboard commands or controls. Likewise, the manual is simple and to the point. It outlines basic game play and directions and provides warranty information. It even tells you how to get another pair of 3-D glasses to replace the ones you'll probably wear out. And if you purchase *Warp Fighter 3-D*, you will very likely have to purchase another pair.

This is the first 3-D Simulation I tried; the 3-D aspect is a new twist on an old theme. The monitor actually shows a three-dimensional picture using the blue and red color scheme; the cross hairs and enemy ships are the primary objects that really stand out (the manual recommends adjusting the brightness to help bring out the 3-D aspect). However, I discovered that once I got deeply involved with the game, I wasn't really aware (consciously, at least) of the 3-D graphics. It is difficult for me to describe to you. It's one of those things that you have to see for yourself. I played *Warp Fighter 3-D* both with and without the 3-D glasses and the 3-D option, and enjoyed game play either way. I think you will, too.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; $24.95 plus $3 S/H)

—Greg Snow

Software
CoCo 3

Deluxe Icon Editor— A Must for *Multi-Vue*

As the "new" CoCo 3 continues to mature, we are beginning to see new and exciting programs enter the market. With the introduction of *Multi-Vue* for OS-9 Level II, we gained a graphic interface for our CoCo. Now we have a utility that helps us use this new interface without having to be programmers.

Deluxe Icon Editor from Puritas Springs Software is for the CoCo 3 with 512K of memory, one or more disk or hard drives, and a TV or monitor. Use of a mouse and an RGB monitor is optional but recommended. It runs under OS-9 Level II with *Multi-Vue*.

I, for one, am really glad to see a program that makes some use of all this hardware and software I have invested in, especially *Multi-Vue*. *Deluxe Icon Editor* allows you to easily create original icons for your programs and to run them with a touch of the mouse. This allows you to set up an icon for any OS-9 program that can easily be run by anyone. No longer will the novices in the house refuse to look at BASIC09 or *DynaCalc* because it is difficult to learn the OS-9 menu system. Now they won't have to.

Deluxe Icon Editor is a machine language utility that comes on a disk. The instructions are included in a file on the disk. This may not be as nice as having a manual, but I'm sure it helps hold down the cost. The manual prints out to slightly more than seven pages and clearly describes the operation of the program. I was able to create and run an icon for *DynaCalc* in a short time. There is also an icon for BASIC09 supplied on the disk that worked well with my copy of BASIC09.

The main screen or window used by *Deluxe Icon Editor* is divided into five parts. First, there is the menu bar, which functions much the same as the *Multi-Vue* bar. It consists of a Files menu, which allows you to create new files, open existing files, save files, abandon files, delete files, or quit the program. Second, there is a Disk menu, which allows you to change working or data directories or to see the current directories. Third, there is a Colors menu, which allows you to choose your current color. Fourth, there is the AIF section, which allows you to specify the name for the application along with the parameters for the window it is to use.

Last is the Color Bar, Icon Window and Icon Work Area part that allows you to create the icon. Color Bar works in a similar fashion to Color Menu and allows color selection. Icon Work Area is a 24-by-24 grid that allows the icon to be drawn dot by dot. The icon is displayed in Icon Window as it is being drawn to show the actual size of your work.

If you have the right setup, *Deluxe Icon Editor* is one good utility to add to your collection. At the price Puritas Springs Software is asking for this program, it is quite a bargain.

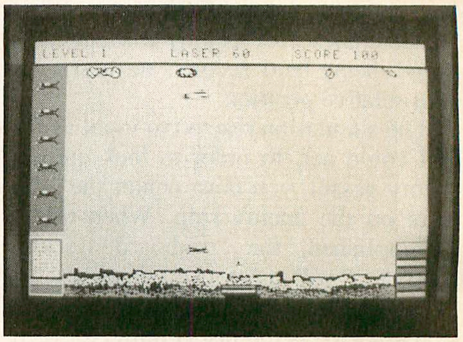
(Puritas Springs Software, Ameritrust Building, 17140 Lorain Ave., Cleveland, OH 44111, 216-251-8085; $10.95: First product review for this company appearing in THE RAINBOW.)

—Barry Pottinger

Software
CoCo 3

Frogday Afternoon— Adventures of an Underwater Courier

Frogday Afternoon from K-Soft is an arcade-style game of action on the ocean floor. The scenario involves protecting a solitary frogman as he swims to and fro carrying crystals to the generator of an underwater city. All is well and good except for the obligatory bad guys, who really don't want the frogman to succeed in delivering his parcel.



Frogday Afternoon begins with some very flashy title screens and then prompts for either an RGB monitor or a color TV (this adds a lot to the program, because many CoCo 3 owners don't yet own an RGB monitor). The game screen appears and you are set to defend your frogman from subs, squid and torpedoes. The object is to give the frogman enough time and protection to get to the other side of the screen. As enemy subs cruise by overhead, taking potshots at your hero, you take potshots at them.

The program is written in machine language and uses some really good sound effects and graphics, compliments of the CoCo 3. However, I would not say that the game offers a good challenge to anyone above 12 years of age. I was able to get to Level 6 out of 8 the day I received the program to review. I admit that after Level 4 things do get more difficult, but with a few days' practice, *Frogday Afternoon* can easily be mastered. I did not notice any errors in the program, which is a plus in its favor.

The most challenging aspect of the program is its joystick operation. You don't just point and shoot. Rather, you must adjust for how far away the enemy is. Your "gun" seems almost like a whip: You control how far the "rope" travels, and only the "tip" does any damage. So, in order to destroy squid and enemy subs,

TOM "SANTA" DYKEMA'S SPECIAL FOR GOOD LITTLE BOYS & GIRLS!

Get 76 disks or tapes full of over 760 quality programs. Here's what you will receive:

★ Over 380 Utility/Home Application programs, including word processors, spreadsheets, disk utilities, business software, electronic and machine language series, education programs for kids, plus much more!

★ Over 300 exciting games including Battle Tank, Mrs. PAC, Star Trek, Flight Simulator, Wizard, Football, Moon Rover, Plus Much More! MANY Machine Language!

★ Over 50 adventures, including Dungeon Master, Genesis, Hostage, Rambo, Dracula, plus 32K graphic adventures!

U.S.A.
PHONE ORDERS:
WE PAY NEXT
DAY SHIPPING!

NOW

REG. $608.00

NOW

$199.00

Holiday Bonus: Order This month and receive a **FREE 6 Month Subscription!**

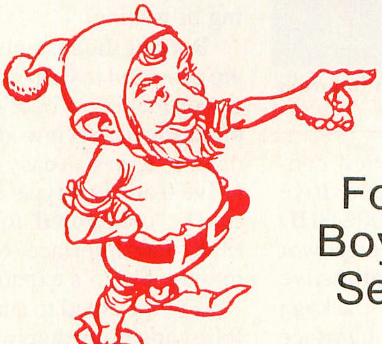
Individual Issues Sell For $8.00 Each
or $608.00 For All 76.
We Slashed the Price To Only $199!

MasterCard

VISA

★ Includes Documentation.
★ Available For COCO 1, 2, and 3.
★ We Pay Shipping
★ Personal Checks Welcomed.
★ Please Specify Tape or Disk.

RAINBOW
CERTIFICATION
SEAL



For Naughty
Boys and Girls
See Page 41.

T&D SUBSCRIPTION SOFTWARE • 2490 MILES STANDISH DR. • HOLLAND, MI 49424 • (616) 399-9648

you take your aim and then estimate how far away the target is.

The documentation is rather short, but it does give most of the necessary information needed to play the game. The program will run only on a CoCo 3 and requires a joystick. A TV may be used. However, I would highly recommend an RGB monitor, because *Frogday Afternoon* gives great detail to the graphics and sound portion of the Color Computer 3.

(K-Soft, 300 13th N.E., E. Wenatchee, WA 98802, 509-884-0338; $24.95)

—Corrie Bender

Hardware

Arizona's Hard Drives—Inexpensive Hard Drives for OS-9

The advertisement reads "Hard Drives for the Price of Floppies." Well, I can tell you that this is no ploy and, in fact, is true. Arizona Small Computer Peripherals has OS-9-capable hard drives for your CoCo for as little as $120 for a 5-megabyte version or $160 for the 10-megabyte version. These prices include the drive, controller, power supply and cables. You must provide a cabinet of your choice and a hard drive interface to the CoCo.

This Arizona hard drive is shown in a case with a Disto controller attached.

The unit furnished for this review consisted of a 20-Meg CMI 6426 hard drive with a Western Digital WD-1002-SHD controller. The drive, controller and power supply were all installed in an attractive case. Also included in the review package was the Disto/CRC Hard Drive Interface attached to the end of a 32-inch flat ribbon cable, which terminated inside the hard drive case. The drives are full-height, so they are bulkier than the newer half-height variety. However, the lower cost makes up for this small inconvenience. This neat 20-Meg package sells for $350 and is an excellent buy if you are serious about adding a hard drive to your CoCo OS-9 system.

> *"If you have not experienced the sheer joy of owning a hard disk, I can recommend this Arizona unit without reservation."*

I was impressed with the quality of the hardware package except for one thing: The drive has no ON/OFF switch. Perhaps this is of little consequence to users with plug-in power strips and main power switches, but I object to the lack of such a switch because I don't want the hard drive running when I'm using Disk BASIC and floppies. It seems to me that needless wear and tear on the drive's bearings could be avoided with the addition of an inexpensive switch. However, Arizona Small Computer Peripherals boasts extensive quality checks on their hard drives and warrants them for 180 days.

The completed unit is heavy, weighing in at a mighty 11 pounds, which includes case, power supply and the Disto interface. It measured 7 inches wide by 4 3/4 inches high by 11 1/2 inches deep, making it just a little smaller than a shoe box. A little red LED (light emitting diode) on the front panel flickers when the drive is reading or writing.

Booting the system is easy. Instructions are provided to help you through the process of making a boot disk. The unit supplied for the review already had the boot disk, so it was an easy matter to insert it in Drive 0 and just type `DOS`. This boot disk can be configured for any slot in your Multi-Pak Interface, or it can go directly into the CoCo's expansion slot.

If you wanted to start from scratch, the following procedure will build a new boot disk for incorporating the hard disk into your system. Level I OS-9 users need only change their startup file to load `ascp.harddisk` from the Disto disk and `link h0` and `cchdisk` as shown here:

```
load /d1/ascp.harddisk
link h0 cchdisk
```

Level II users have to build a new boot disk to include `h0` and `cchdisk` in this manner (assuming two floppy drives):

```
merge/d0/os9boot
   /d1/ascp.harddisk
   /d0/newboot
attr newboot e pe
copy /d1/cmds/dmode
   /d0/cmds/dmode
```

Remove the Disto disk from Drive 1 and replace it with a newly formatted disk. Type this:

```
os9gen /d1
/d0/newboot
```

Check the modules in the newly created os9boot file in Drive 1:

```
ident /d1/os9boot
```

Check that all module crc's are good, then copy all files from your system disk in Drive 0 to the new boot disk in Drive 1:

```
dsave -s48 /d0 /d1 ! shell
```

After doing all this, you can now do a reboot of OS-9 from a cold start using the new boot disk. It will take about 30 seconds for the hard drive to get up to speed. If you watch the hard drive's LED, you will see it flicker at about the same time the OS-9 sign-on message appears. Further instructions are provided to format the hard disk. The unit supplied for this review was already formatted and even contained a number of OS-9 public domain programs. Arizona Small Computer Peripherals gives its customers these programs with an offer to make the boot disk from a customer-supplied OS-9 disk with the `cmds`, `grfdrv` and `shell` modules.

If you have not experienced the sheer joy of owning a hard disk, I can recommend this Arizona unit without reservation. If you are into OS-9, you will find your investment well justified. The access speed and mass storage capability make this hard disk drive a natural.

(Arizona Small Computer Peripherals, 930 W. 23rd St., Suite 26, Tempe, AZ 85282, 602-829-8028; $120 for 5-Meg kit, $140 for 8-Meg, $160 for 10-Meg, $350 for complete 20-Meg system: First product review for this company appearing in THE RAINBOW.)

—David Miller

Diskman II— Preventive Maintenance for Floppies

In May 1987's RAINBOW (Page 134), I wrote a favorable review of the original version of *Diskman*. This program was designed to protect the computer user from garbled directories by backing up the directories on either the original disk or a second disk. Since the directory track is the most used portion of a disk, it is the most likely source of trouble. In addition to the ability to back up directories, the program also allowed examination and change in any sector on a disk — interchanging or alphabetizing directory files, scanning and printing out directories.

Now Tothian Software has revised the program and renamed it *Diskman II*. The program requires a 32K CoCo, at least one disk drive and a printer if printouts are desired. The changes include the addition of a multiple-disk drive mode and the support of CoCo speed-up pokes. *Diskman II* uses machine language where appropriate to prevent crashes and includes three new options.

When you boot the program, you will see a menu of options. Option 0, the disk drive mode, allows the user to choose between one- and two-drive operation. Option 1 reads disk directories and makes a backup on the same or a different disk. Option 2 restores a lost directory from the backup copy. Option 3 examines and/or changes any sector on a disk. (Note: This option requires detailed knowledge of computer language and can cause serious damage to a program. A warning sounds when Option 3 is chosen.)

Option 4 reorganizes a directory, and Option 5 alphabetizes it. Option 6 displays stored directories on the screen if the directories are stored on a separate disk. Option 7 displays the directory currently in use. Option 8 prints out a directory catalog showing the number of free granules on each disk, filenames and extensions, types of files, etc. Option 9 searches for a particular file if you have a separate disk for your directories.

Option U removes a backup directory from a disk. Finally, Option C checks the readability of a disk, granule by granule. Bad granules can be blocked out, and this option lets you identify the current use of each granule. Note: Like Option 3, this option is for the experienced programmer.

In addition to these options, *Diskman II* comes with a companion program, *File-Copy*, which aids in reviving files that are unreadable because of I/O errors.

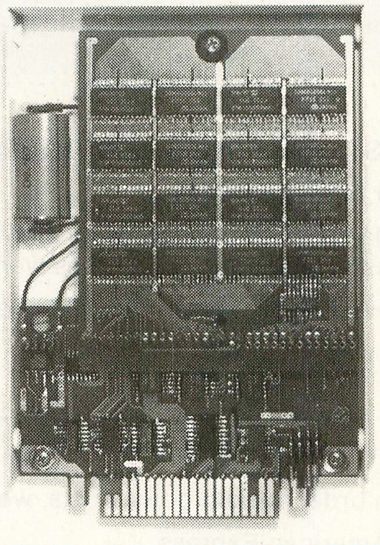
> ***"Diskman II provides the ability to scan a disk and either block out or change any sector."***

Diskman II offers several useful additions to the original version. For the experienced programmer, it provides the ability to scan a disk and either block out or change any sector. The program is user-friendly and comes with five pages of clear instructions. *Diskman II* and its companion program are useful utilities and well worth their price.

(Tothian Software, Box 663, Rimersburg, PA 16248; $24.95)

—Mel Siegel

SolidDrive™ by Vidicom Corp



SolidDrive™ - a ramdisk that doesn't forget! Fully Static, battery backed CMos ram makes SolidDrive™ ready to use instantly. You can forget formatting and copying work files to ramdisk then copying back your changes to floppy. You can forget fear of power failures. The instant power loss occurs, SolidDrive™ write-protects itself and your valuable work. SolidDrive™ gives you state-of-the-art surface mount technology. That's why we have the best guarantee in the industry - Two years limited repair or replacement! SolidDrive™ is compatible with Multi-Pak® and comes complete with OS9® Level I or II device driver, formatter and self-test software. Available in 512K and 1 Megabyte versions. Factory upgrades available for 512K version. RSDos Driver now available, treats SolidDrive™ as 3 or 6 SSSD RS devices (4-6,4-9). Disk loaded version free on request! 27C64 EProm version $19.00

SolidDrive™ by Vidicom Corp
512K (524,288 bytes) $395.00
1 Meg (1,048,576 bytes) $695.00
Please add $4.00 shipping
Arizona Residents add 5.5% Sales tax
Visa MasterCard orders welcome

SolidDrive™ is the fastest, most reliable long-term storage available to the small computer user!

Vidicom Corp 20 E. Main St. Suite 710
Mesa, AZ 85201 (602) 827-0107
Hours M-F 9:00 am - 5:00 pm MST

OS9 is the trademark of Microware Systems Inc and Motorola Inc. Multi-pak is the trademark of Tandy Corp.

PLAY THE GAME BETTER ON YOUR TANDY!

If you want to get the best out of games on your Tandy computer, then you'll want to get your hands on The Gravis Joystick Controller.

Today's games demand speed, accuracy and precise control. Of you *and* your equipment. The Gravis Joystick will make you a much better player. Exclusive Gravis features include:

- Full-size pistol grip handle
- Handle fire button
- 8-position centering tension control
- 3 independent microswitch fire buttons
- Unique rugged construction
- One year warranty

The Gravis Joystick — it outperforms all other Tandy Joysticks.

Order yours today from:
Game Point Software,
P.O. Box 6907, Burbank,
CA. 91510-6907,
Tel 818-556-3571.
Price $44.95 plus $4.00 shipping.

Sug.Retail
$59.95
Game Point
price $44.95

Advanced GRAVIS
Computer Technology Ltd.

Protect and highlight your important magazine collection with sturdy RAINBOW binders

RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
RAINBOW
CoCo Power!

Distinctive, Durable RAINBOW Binders

THE RAINBOW is a vital resource to be referred to again and again. Keep your copies of THE RAINBOW safe in our quality, distinctive binders that provide complete protection.

These **attractive red vinyl binders** showcase your collection and ensure your RAINBOWS are in mint condition for future use. Each binder is **richly embossed with the magazine's name in gold** on the front and spine. They make a handsome addition to any room.

Put an End to Clutter

Organize your workspace with these tasteful binders. Spend more time with your CoCo and eliminate those frustrating searches for misplaced magazines.

A set of two binders, which holds a full 12 issues of THE RAINBOW, is only $13.50 (plus $2.50 shipping and handling).

Special Discounts on Past Issues

To help you complete your collection of THE RAINBOW, we're offering a **special discount on past issues** of the magazine.

When you place an order for six or more back issues of THE RAINBOW at the same time you order binders, you are entitled to $1 off the regular back issue price. To order, please see the "Back Issue Information" page in this issue.

Know Where to Look

You may purchase the "Official And Compleat Index To THE RAINBOW" for $1 when you purchase a set of binders. This comprehensive index of RAINBOW's first three years (July 1981 through July 1984) is usually priced at $2.50.

For greater convenience, order RAINBOW Binders through the shopping area of the CoCo SIG of Delphi!

……

______ **YES**. Please send me ________ set(s) of RAINBOW binders

Take advantage of these special offers with your binder purchase:

______ Save $1 off the single issue cover price for back issues. Minimum order of 6 magazines. Please enclose a back issue order form from a recent issue indicating magazines wanted.

______ Purchase the "Official and Compleat Index to THE RAINBOW" for $1. (Regular price $2.50.)

(These offers good only with the purchase of a RAINBOW binder set)

Name ____________________
Address ____________________
City ____________________ State ________ ZIP ________
☐ My check in the amount of ________ is enclosed. (In order to hold down costs, we do not bill.)

Charge to: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ____________________ Expiration Date ________
Signature ____________________

Mail to: **Rainbow Binders, The Falsoft Building, P.O. Box 385, Prospect, KY 40059.**

Binders are $13.50 per two-binder set plus $2.50 shipping and handling. If your order is to be sent via U.S. mail to a post office box or foreign country, please add $2. Kentucky residents add 5% sales tax. U.S. currency only, please. In order to hold down non-editorial costs, we do not bill.

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST

All other inquiries call (502) 228-4492.

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

Ghost Hunters, a one- or two-player game in which it is up to you to destroy four plasma disrupter wave generators in order to send 50 troublesome ghosts back to their own plane. *Ghost Hunters* is a scenario created under SPORTSware's *Wargame Designer* and can be modified by those who own *Wargame Designer*. Requires a CoCo 3 and a disk drive. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $15.*

Graphics Designer Plus, an upgrade to *CoCo Graphics Designer* that's rewritten in assembly language to incorporate a point-and-click graphical interface with windows, scroll bars, buttons, dialog boxes and WYSIWYG on-screen previews. "Produces signs, banners and greeting cards on most popular dot-matrix printers." New features include higher resolution borders and support for more fonts and pictures on each creation. Includes border, font and picture collections. Requires 64K and a CoCo 2 or 3, disk drive, a joystick or mouse and a compatible printer. *Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421, (718) 296-2385; $29.95 plus $3 S/H, upgrade available for $20 and original* Graphics Designer *disk.*

◆ **Hard Drive Utilities Program**, a disk of utilities designed to run under the Burke & Burke *Hyper-I/O* operating system. The program allows users to copy and kill selected files, back up the hard drive to floppies, restore a hard drive from floppies, search for files and more. Requires a CoCo 3, OS-9 Level II and Burke & Burke's *Hyper-I/O KB Enterprises, 435 Brightwaters Drive, CoCoa Beach, FL 32931, (407) 799-3253; $21.95 plus $1.50 S/H.*

◆ **Kcal**, a calendar-generation program written partly in machine language that bases all its calculations on January 1, 1988 (it will create calendars only from this date forward). DMP-compatible printers can be used to print a calendar 7 inches high by 8 inches wide. Requires a 32K Extended Color BASIC computer, a disk drive or cassette and a DMP-compatible printer. *King Cottage Industries, 1814 Valley St. NE, Poulsbo, WA 98370, (206) 697-5576; $6.*

Keyboard Extension Cable, a 5-foot extender cable that lets users back off from their setup. It requires opening up the CoCo. The cable is available in custom lengths, as well. *HAWKSoft, P.O. Box 7112, Elgin, IL 60121, (312) 742-3084; $25.*

Math Tutor, an educational math program that's part "private drill coach" and part arcade game. The display appears as a shooting gallery. Three lesson types are available: arithmetic, fractions and algebra. Comes on a ROM pack for any Color Computer that has at least 16K. *Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $24.95: Available in Radio Shack stores nationwide.*

Orc Ambush, a game in which you and your elven friends must retrieve a wizards's treasure chest of magic herbs from the devious Orcs. *Orc Ambush* is a stand-alone scenario created with *Wargame Designer* for the Color Computer 3. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $15.*

◆ **Rustler**, a Hangman-type game in which you are the only hope of saving an innocent cowpoke from swinging at the town scaffold. Requires a 32K ECB Color Computer and a cassette player or disk drive. *King Cottage Industries, 1814 Valley St. NE, Poulsbo, WA 98370, (206) 697-5576; $5.*

Space Intruders, a *Space Invaders*, arcade-type game that features 16-color graphics and sound on the Color Computer 3. The goal is to destroy the intruders with a "particle beam laser cannon" before they reach the ground. Requires a CoCo 3. *Game Point Software, P.O. Box 6907, Burbank, CA 91510, (818) 566-3571; $24.95 plus $3 S/H.*

SPORTSware's Catalog on Disk, a flippy disk with graphics files that illustrate some of SPORTSware's products. Runs on the CoCo 3 only, although it covers some CoCo 2 software. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $3, but refundable on the purchase of a SPORTSware product.*

Tetris, a game of spatial skill from Russia that requires users to rotate and place shapes composed of four blocks. When a row is completely filled up, it disappears. As more lines disappear, the skill level increases and the shapes drop at a faster rate. Requires a CoCo with a minimum of 32K, or a CoCo 2 with 64K, or a CoCo 3. *Tandy Corporation, 1700 One Tandy Center, Ft. Worth, TX 76102; $29.95: Available in Radio Shack stores nationwide.*

TextPro IV, a text editing/word processing program written in machine language for the CoCo 3. Features include search-and-replace, automatic line numbering and justification, variable fonts, footers, onscreen display of character special effects, supports for laser printers with proportional fonts and more. Requires a 128K or 512K CoCo 3 and disk drive. On 512K systems, *TextPro IV* automatically installs two RAM disks as drives 2 and 3. *Cer-Comp, 5566 Ricochet Ave., Las Vegas, NV 89110, (702) 452-0632; $89.95.*

◆ **UPDOS**, an EPROMable Disk Extended Color BASIC enhancement for the Color Computer 3 that includes command line recall and editing routines, commands that manipulate graphics compatible with *Color Max 3/ Deluxe*, and that invoke the DOS command on power-up to boot OS-9 automatically. Requires a CoCo 3. *ESP, P.O. Box 63065, Wichita, KS 67203, (316) 946-0440; $24.95.*

Wargame Designer Icon Disk #1, a *Wargame Designer* system accessory that contains eight sets of 66 icons, including humans, elves, standard military symbols, ghosts, robots, desert armies, British and Zulu soldiers, cowboys and Indians, and more. Icons can be viewed at five times their actual size. Requires a CoCo 3 and *Wargame Designer*. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $10.*

◆ **First product received from this company**

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

—Lauren Willoughby

If OS-9 seems a little backward, this utility can help

What Day Is It?

By Richard Ries

When I was in school, I was taught to write the date in the following order: month-date-year. I've grown accustomed to that order, and I use it in all situations — except one. When I use OS-9, I am prompted to enter the date in this order: year-month-day. I never get that right. I always have to back up and re-enter the date. (This can be rather disheartening at the beginning of a programming session.) Maybe I should adjust, but I don't want to change my habits.

Finally, I decided that the computer and I would both be happier if I wrote a small program that let OS-9 accept the date in the format I preferred. The result of this decision is *Set Date*, a utility that you can add to your `StartUp` file.

To use *Set Date*, type it in and save it. Next enter `pack`, and BASIC09 will compile the program into a machine-usable program in the `CMDS` directory. After the program is written and packed, edit your `StartUp` file by replacing the following line:

```
setime </term
```

with this line:

```
setdate </term
```

The next time you boot up OS-9, you will be prompted to enter the date (in month-date-year format) and then the hour, minute and second. *Set Date* then switches the date's order to the format OS-9 uses and runs `Setime` to set OS-9's clock/calendar. One note of caution: *Set Date* should be the last line in your `StartUp` file. For some reason (which probably has to do with "forking shells") any lines after the `SETDATE` command are lost.

I hope this program will be as useful to you as it is to me. If you have any questions about BASIC09, I suggest you read Dale Puckett's book, *The Official BASIC09 Tour Guide*. It explains things in a clearer manner than the manual that comes with BASIC09.

(*Questions or comments about this utility may be directed to the author at 361 Deauville Blvd., Copiague, NY 11726. Please include an SASE when requesting a reply.*) ☐

The Listing: `SetDate`

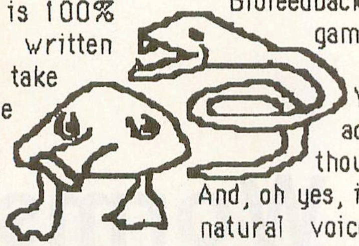
```
PROCEDURE setdate
 0000      (* Copyright 1988 *)
 0014      (* Richard J.Ries *)
 0028      DIM date,time:STRING[8]
 0038      DIM oldate:STRING
 003F      DIM ipath:INTEGER
 0046      ipath:=0
 004D
 004E      PRINT "Please enter the date: "
 0069      PRINT " (mm/dd/yy) ";
 007A      INPUT #ipath,date
 0084
 0085      PRINT "Please enter the time: "
 00A0      PRINT " (hh:mm:ss) ";
 00B1      INPUT #ipath,time
 00BB      (* pack out missing seconds. *)
 00DA      IF LEN(time)<8 THEN
 00E7        FOR n=LEN(time)+1 TO 8
 00FE          time=time+"0"
 010A        NEXT n
 0115      ENDIF
 0117
 0118      oldate=" setime "+RIGHT$(date,2)+" "+LEFT$(date,LEN(date)-3

            )+" "+time
 0146      (* set the clock *)
 0159      SHELL oldate
```

Richard Ries is an electronics technician who integrates hardware and software at work. In his spare time, Richard enjoys programming on his CoCo.

Dr. Preble's Programs

For Color Computer Software
Since 1983

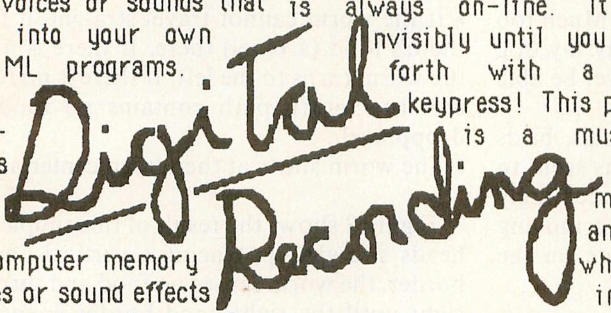
Pyramix



This fascinating CoCo 3 game continues to be one of our best sellers. **Pyramix** is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordon Tsvetkoff and a product of **ColorVenture.**

The Freedom Series

Vocal Freedom



I've got to admit, this is one nifty computer program. **Vocal Freedom** turns your computer into a digital voice recorder. The optional **Hacker's Pac** lets you incorporate voices or sounds that you record into your own BASIC or ML programs. This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an automatic message minder. Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the prerecorded message! Disk operations are supported. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifier (RS cat. #277-1008) and any microphone.

Mental Freedom

Would your friends be impressed if your computer could read their minds? **Mental Freedom** uses the techniques of Biofeedback to control video game action on the screen. Telekinesis? Yes, you control the action with your thoughts and emotions. And, oh yes, it talks in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675.

BASIC Freedom

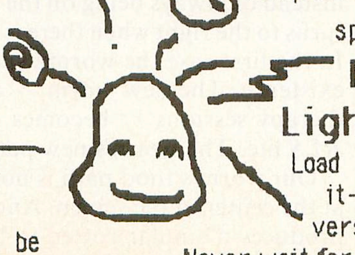
Do you ever type in BASIC programs, manually? If you do, you know it can be a real chore. **Basic Freedom** changes all that. It gives you a full screen editor just like a word processor, but for BASIC programs. Once loaded in, it is always on-line. It hides invisibly until you call it forth with a single keypress! This program is a must for programers or anyone who types in programs. By Chris Babcock and a product of **ColorVenture.**

Lightning Series

These three utilities give real power to your CoCo 3.

Ramdisk Lightning

This is the best Ramdisk available. It lets you have up to 4 mechanical disk drives and 2 Ram drives on-line and is fully compatible with our printer spooler below



Printer Lightning

Load it and forget it--except for the versatility it gives you. Never wait for your printer again! Printer runs at high speed while you continue to work at the keyboard!

Backup Lightning

This utility requires 512K. Reads your master disk once and then makes superfast multiple disk backups on all your dirves! No need to format blank disks first! Supports 35, 40 or 80 track drives.

COCO Braille

Produce standard grade 2 Braille on a **Brother** daisy wheel printer. Easy to use for sighted or blind user. No knowledge of Braille is necessary. Call for free sample.

Prices

CoCo 3 only

Ram Disk Lightning, Disk	$19.95
Printer Lightning Disk	$19.95
Backup Lightning, Disk	$19.95
All three, Disk	$49.95
Pyramix, Disk	$24.95

CoCo 1,2, or 3

Vocal Freedom, Disk	$34.95
Vocal Freedom Hackers Pac	$14.95
COCO Braille	$69.95

CoCo 2 or 3 only

Mental Freedom, Disk	$24.95
Basic Freedom, Disk	$24.95

CoCo 1 or 2 only

VDOS, The Undisk, ramdisk for the CoCo 1 or 2 only, Tape	$24.95
VDUMP, backup Undisk files to single tape file, Tape	$14.95
VPRINT, Print Undisk directory, Tape	$9.95

Add $2.50 shipping/handling in USA or CANADA
Add $5.00 to ship to other countries

Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
24 Hour Hot Line
(502) 969-1818
Visa, MC, COD, Check

Barden's Buffer

The worm that ate Fort Worth and other CoCo stories

Food for Worms

By William Barden, Jr.
Rainbow Contributing Editor

With all the talk about neural networks these days, I thought it might be nice to emulate life on a CoCo. Why not try a lower form of life? Perhaps a programmer or life insurance salesman? No, I decided these life forms were too complex. (I still don't understand annuities.) Maybe a orangutan or a chimp? Nope. Much too complicated. A dog? Since I can't understand why my dog barks at *me* when I enter a room, I thought I'd never be able to emulate *his* mind.

Eventually, after passing through lower mammals, birds and reptiles, I settled on a worm. After all, worms seem to lead leisurely lives, munching their way through a seemingly endless supply of food. They also leave trails when moving through earth, wood or paper — easy to simulate on the screen of the CoCo.

A First Attempt

Suppose our CoCo screen contains a *phosphor* worm. This worm lives on screen phosphor, just as a bookworm consumes paper. The phosphor worm contentedly munches its way through the CoCo screen phosphor until the phosphor is gone. At that point the worm dies.

The basic simulation for this is shown in Figure 1. It's a 256-by-192 CoCo 1, 2 or 3 graphics screen with a border. The border is drawn by a `LINE(0,0)-(255,191),PRESET,B` command. We'll assume the border contains an electric charge that keeps the worm from moving past it.

My first attempt at creating this simple life form (Quick, Igor, the switch!) obeyed these simple rules:

- The worm can travel up, down, right or left, but can't move diagonally across the screen.
- The worm travels in the same direction until it senses that the next pixel contains no food (i.e., if it has already passed over a pixel or is at a border).
- If the worm cannot travel straight, it turns to the right, *if* there's food (a pixel) there. If there is no food to the right, the worm turns to the left. If there is no food there, the worm dies (its return path contains no food — just phosphor droppings).
- The worm starts at the screen center and moves up.

Figure 2 shows the result of this simple life. The worm first heads straight up, tracing a vertical line as it goes. At the border, the worm senses no food and turns right. It continues right until the right-hand border is encountered, at which point it follows that border to the bottom of the screen. At the bottom border, the worm turns right and continues across the bottom of the screen to the left-hand border where it begins moving up again. At the top border the worm turns right again, marching across the screen until it reaches the vertical line in the center. Then the worm moves down until it reaches the bottom (no food) border. The worm turns to its right (left on the screen) and continues around the border until it eats its way into the center and dies.

OK. It's not a remarkable life; it's a pretty boring picture, to say the least. However, if the rules of the life are changed slightly, the worm's life gets more interesting. Suppose that instead of always being on the straight and narrow, the worm turns to the right when there is a food supply in that direction. In the first case the worm lived an *SRL* (straight, right, left) existence. The new worm — after est, Dianetics, and a few therapy sessions — becomes a little kinky and develops an *RLS* life. The worm's new pattern is shown in Figure 3.

Our worm's food path is now diamond-shaped and begins at the center of the screen. Another variation, an *RSL* worm, produces a similar rotten-to-the-core display, but creates a center square instead of diamond. (See Figure 3.)

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

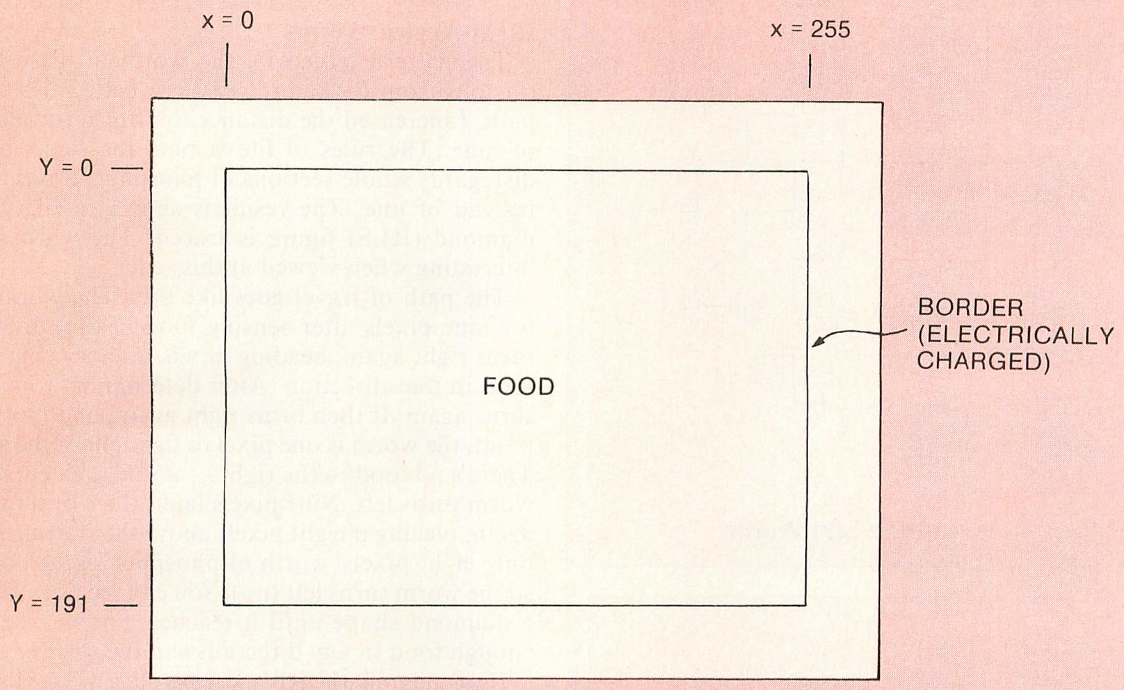


Figure 1: The Land of the Phosphor Worm

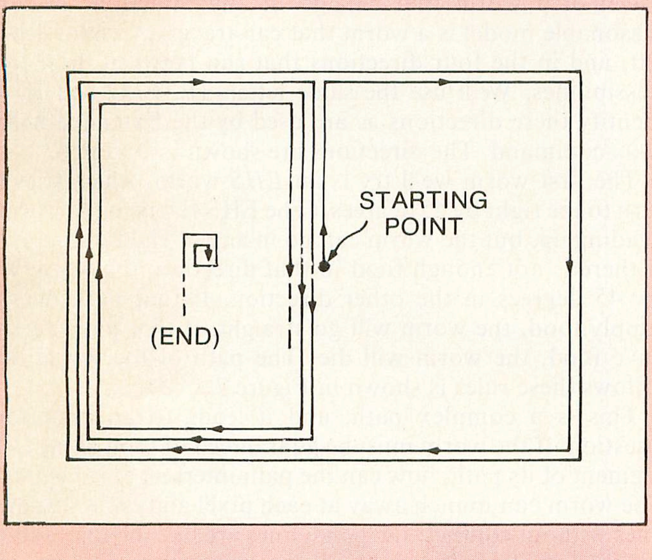


Figure 2: An S(1)R(1)L(1) Worm's Life

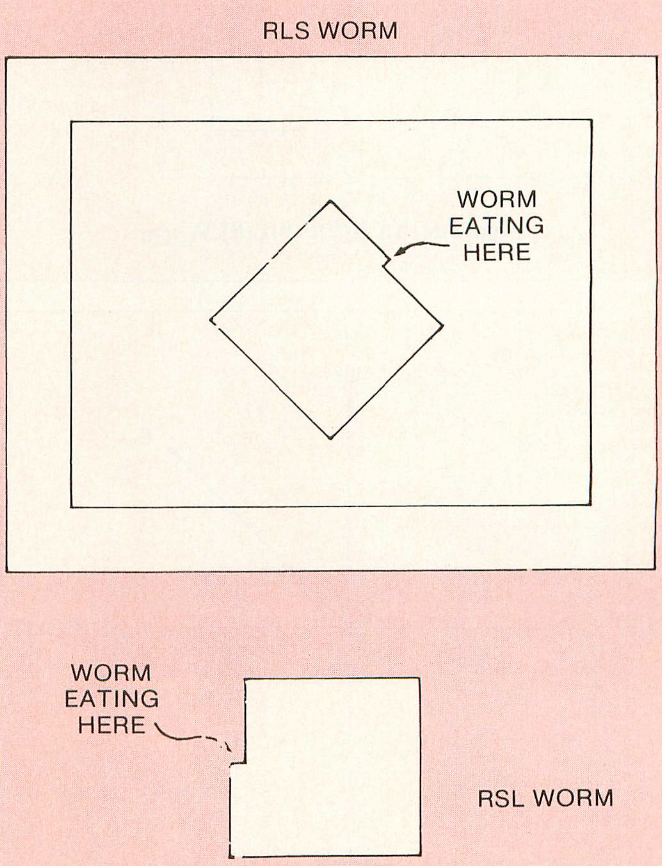


Figure 3: The Eating Patterns of RLS and RSL Worms

PREMIUM COCO3 512K UPGRADE

- Made in USA by J&R Electronics
- Memory chips socketed, user replaceable
- Rugged, long life construction
- Top mounted Memory for cooling
- Heavy duty POWER and GROUND planes to minimize memory errors due to noise
- High performance design, permits use of less expensive 150ns memory chips
- We supply Prime memory chips, not inferior pulls or fallouts*
- Includes RAMDISK, Spooler and Memory Test software on disk with 28 page User's Manual (We set the standard for 512K support software. We believe our software is uniquely powerful, as opposed to those 'Me, too' companies that charge extra for software with much less power!)

SPECIAL PRICES

#1010-**29.95** JramR bare board plus connectors and software
#1014-**39.95** JramR assembled & tested 0K (No memory chips) and software
*CALL (for latest price of #1014 with memory chips and other products)

To place an order, write to: **J&R Electronics, P.O. Box 2572, Columbia, MD 21045,**
OR call **(301) 987-9067**-Jesse or **(301) 788-0861**-Ray

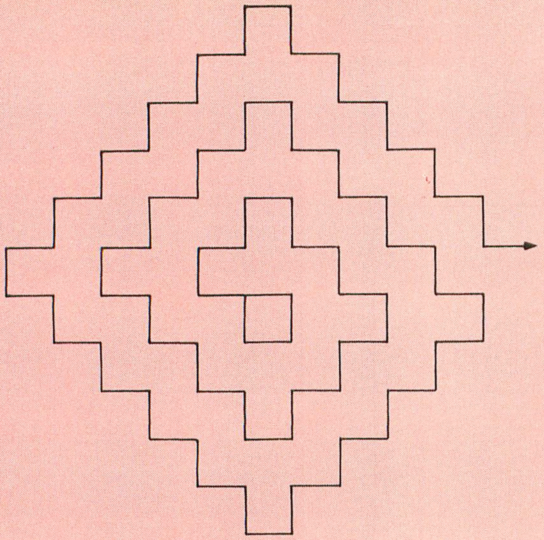


Figure 4: An R(9)L(9)S(9) Worm

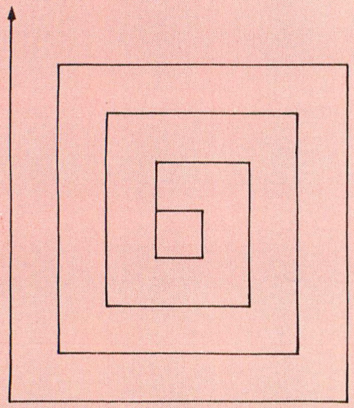


Figure 5: An R(9)S(9)L(9) Worm

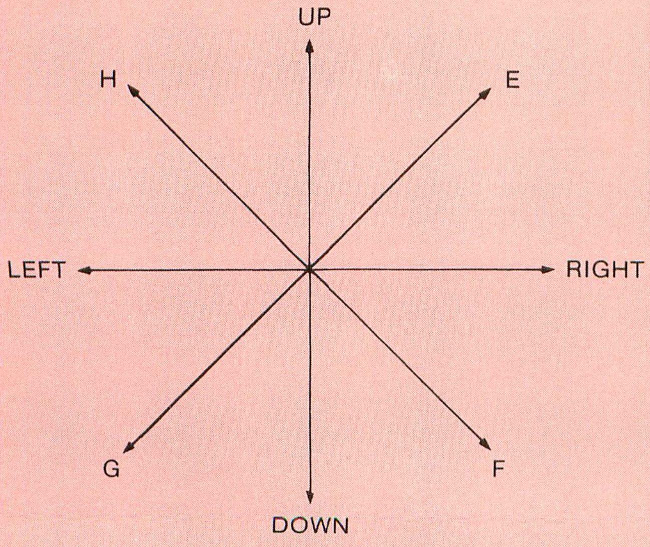


Figure 6: Octagonal Worm Travel

WORM PATTERNS

Right-Angled Worms

The pattern traced by the worm in these figures is not obvious from the figure. To get a better idea of the worm's path, I increased the distance the worm traveled by a factor of nine. The rules of life remain the same, but the worm disregards whole sections of phosphor, traveling nine pixels instead of one. The result is shown in Figure 4, where a diamond (RLS) figure is traced. The worm's life is more interesting when viewed at this scale.

The path of travel goes like this: The worm travels right for nine pixels after sensing food in that direction. It then turns right again, heading down, after sensing nine pixels of food in that direction. After determining food to the left, it turns again. It then turns right again, and moves up. At this point, the worm is one pixel to the right of the starting point. There's no food to the right — it's been eaten. Therefore, the worm turns left. Nine pixels later, the worm turns right (up) again, placing it eight pixels above the starting point. There's only eight pixels' worth of phosphor in the down direction, so the worm turns left (up). You can see how the worm traces a diamond shape until it reaches a point where there's not enough food in any direction and the worm dies.

If we magnify the RSL worm's path, we see that it generates a large spiral. (See Figure 5.)

Octagonal Worms

The worm concept can be extended to worm paths in any direction. However, it becomes quite a chore to maintain the travel of a worm that can go in any direction. A more reasonable model is a worm that can travel up, right, down, left, and in the four directions that run between these four possibilities. We'll use the same letters (E, F, G and H) to identify these directions as are used by the Extended BASIC DRAW command. The directions are shown in Figure 6.

The first worm we'll try is an *EHS* worm, which tries to turn to the right by 45 degrees. (The EHS refers to the worm's heading up, but the worm can go in any of eight directions.) If there is not enough food in that direction, the worm will try 45 degrees in the other direction. If that path doesn't supply food, the worm will go straight. If that path doesn't have food, the worm will die. The path of the worm that follows these rules is shown in Figure 7.

This is a complex path, and it leads to an important question: If the worm must be guaranteed of food along each segment of its path, how can the path intersect existing lines? The worm can munch away at each pixel and cross diagonal lines without conflict. Diagonal lines are like the lines shown in Figure 8. The diagonal lines can be crossed as long as the

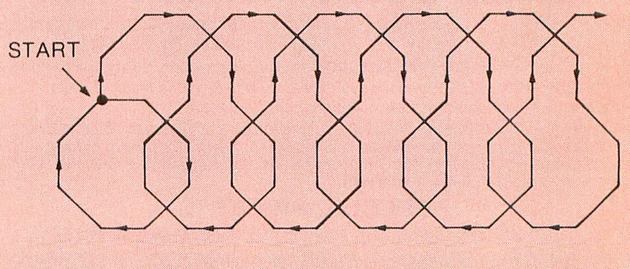


Figure 7: An Octagonal Worm Path

worm path does not intersect a pixel that has been eaten.

In the path shown in Figure 7, the worm dies on the right-hand side of the screen after checking the food 45 degrees to the right, 45 degrees to the left, and straight ahead. (Never mind that there's some food to eat. It's less than what is necessary to survive, and this is a philosophic worm that meets its end without qualms.) To save the worms, we can change the rules and offer them more options. After all, there are seven possible directions for the worm — any valid direction less the one from which the worm just came. The path shown in Figure 9 follows this rule: Turn to the right 45 degrees at a step, taking the first path that offers food. If none of the seven directions offer food, meet the worm deity of your choice.

The path shown in Figure 9 is *quite* complicated. When the worm encounters the top border, it follows that border until it's on the right side of the main path. Then it starts down the screen again. The worm traverses the left side of the main path until it reaches the bottom and finally dies at the upper-left corner of the screen.

Designer Worms

By now you get the idea — there are some interesting designs to be produced on the screen by a few simple, repetitive rules. And we've just touched the surface here. What if you assume the worm does not have to eat continually and allow it to travel through areas that contain no food for a short period of time? To provide a tool for experimentation, I offer the program shown in Listing 1. It's a *Worm Driver.* You define the rules, and the driver does the rest.

I've also included an example of a *Calling* program in Listing 2.

You must provide four things for the *Worm Driver*:

- The starting position on the screen. `X` and `Y` specify a valid x,y coordinate for the 256-by-192 mode.
- The actions to be taken for up, right, down, left, E, F, G and H directions are coded as the string constants `U$`, `R$`, `D$`, `L$`, `E$`, `F$`, `G$` and `H$`, respectively. The first two characters of the string are a zero followed by the number of actions. The remaining characters specify the actions to be taken. In other words, if `U$` is `"07E5R5F5D5G5L5H5"`, we know that there are seven actions if the worm is going up (U): Move five pixels in the E direction if food is found, or move five pixels in the R direction if food is found, or move five pixels in the F direction if food is found, or ...you get the idea. If your worm reaches the action, moves five pixels in the H direction, and cannot act, it will die. For right-angled worms, only the up, down, right and left strings need to be specified. It's all right to use fewer than seven actions. You may want only two or three actions — provided you can get a decent pattern with that number.

The `LA` variable looks for food. It counts the number of pixels in every possible direction. Generally, this value should match the value in the actions (e.g., if `E5` is used to specify a move of five pixels, then `LA5` should be used). However, you may make `LA` larger than any of the pixel values for actions (up to 9). In this case the worm will cross lines (eaten areas), provided there's food on the other side.

The starting direction is specified in `DI$`. Use U, R, D, L, E, F, G or H. Save the *Worm Driver* as an ASCII file (do a `SAVE "WF",A`) and then merge *Worm Driver* with your four or five lines of code defining the rules and starting conditions of the worm path. The parameters used in my previous example are shown in Listing 2.

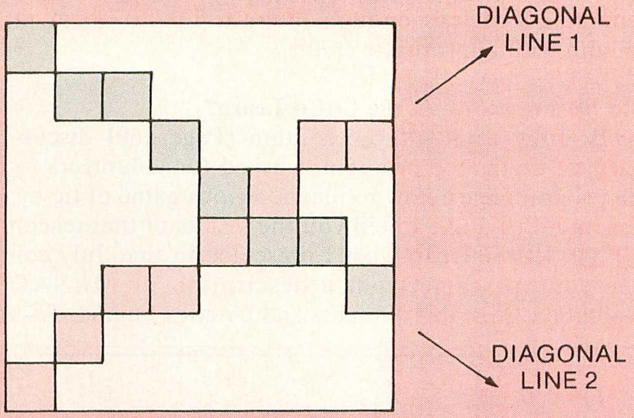


Figure 8: Crossing Worm Lines

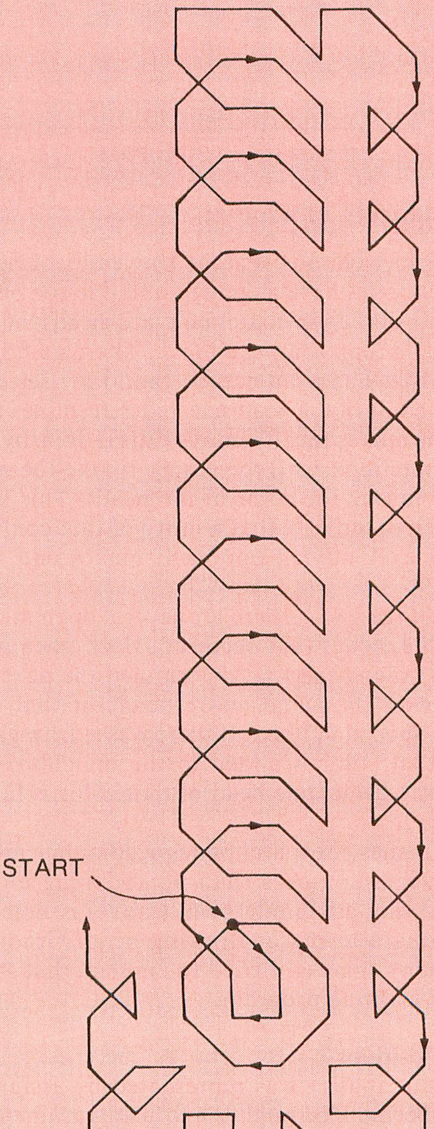


Figure 9: The Path of an ERFDGLH Worm

Please Send Me Worm Trails

Strange as it seems, I'd be interested in the worm trails you generate. If there's enough interest, I'll list them in this column with appropriate credit.

Old Business — Can the CoCo Learn?

My July '88 RAINBOW column (Page 160) discussed a learning tic-tac-toe program. I asked for volunteers to help the program learn how to play a serious game of tic-tac-toe. This month I'd like to tell you the results of that teaching.

First, let me recap what I presented in that July column: The concept came from a description of MENACE, a Matchbox Educable Naughts and Crosses Engine, described by Donald Michie, a biologist at the University of Edinburgh. Michie's matchboxes have a copy of a tic-tac-toe position on their covers. Inside each matchbox are beads of different colors, each bead representing a move. There's a hole in each matchbox so that one bead can be randomly selected from all beads. The color of the bead selected determines the move.

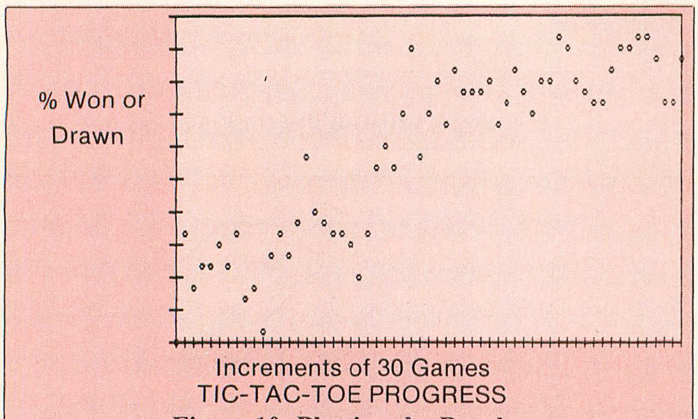


Figure 10: Plotting the Results

The machine makes the first move (this is done by someone shaking the matchbox with the empty tic-tac-toe matrix on the cover and noting the color of the bead). This matchbox is then left open to indicate that a move of that configuration has taken place. A human opponent makes odd moves — 1, 3, 5, 7 and 9.

At the end of the game, there are several open matchboxes representing the moves that occurred. Each open matchbox has a selected color bead that determined the next move. If the machine won the game, more beads of that color are added to each open matchbox. If there was a draw game, only one bead of that color is added to the matchboxes. If the machine lost the game, one bead of that color is taken from each matchbox.

Over many games, the matchboxes accumulate more beads representing winning moves than non-winning moves. The chance of selecting a winning bead (move) is much greater than of selecting a losing or drawing bead. Gradually, the machine becomes smarter. I tried to emulate that strategy in the tic-tac-toe learning program.

Tic-Tac-Toe Positions

The tic-tac-toe matrix was represented by assigning each square a number of 1 through 9 and using a nine-character string to represent an O, X or hyphen (no move yet). The string -X-O--XXO, for example, represents the following:

```
- X -
0 - -
X X O
```

There are 19,683 possible strings of X's, O's and hyphens, but only those strings with an equal number of X's and O's represent valid tic-tac-toe configurations. There are 3,139 possible configurations with an equal number of X's and O's, such as XXXXO-OOO (19,535), XXXXOO-OO (19,553), XXXXOOO-O (19,559), and XXXXOOOO- (19,561). The number in parentheses is the number of the original 19,683 configuration and represents the Base 3 (ternary) number derived by assigning digits of 0, 1 and 2 in place of the X's, O's and hyphens. The ternary number makes it easier to convert a tic-tac-toe configuration to a value that can be found in a table holding the 3,139 possible configurations.

Selecting the Next Move

The next move in Michie's MENACE was made by shaking up the matchbox and choosing a colored bead at random. Michie started out with four beads in each of nine colors for the first-move matchbox, three beads of each color for the third-move matchboxes, two beads of each color for the fifth-move matchboxes, and one bead of each color for the seventh-move matchboxes (the ninth move has only one possibility). We used counts of five, four, three, two and one. The count represents the number of colored beads. The configuration 00--X-X-- is a fifth move configuration with five possible next moves by the machine. We'll put three beads in our figurative matchbox for each of the five possible moves:

```
OO--X-X--      0,0,3,3,0,3,0,3,3
```

The impossible moves (those already occupied by an X or O) are initialized with a count of zero. Possible moves are initialized with a count of three.

The next move can be selected at random by adding up all of the counts (3+3+3+3+3=15) and then generating a random number from one to 15. The machine will accumulate counts from left to right and stop when the total is equal to the random number of zero through 15. The machine will then use the square represented by the position of that count. In this example, if the number generated was eight, the machine would use the third count (tic-tac-toe Square 6). The person would respond with another move creating a new configuration, and the machine would use the same algorithm to compute the next move. The game would continue until a player won the game or a draw occurred.

At the end of the game adjustments are made to the *active* configurations (those used in the game sequence). If the game was won by the machine, three counts are added to each position. Similar adjustments would be made for draws (one would be added) and losses (one would be subtracted). The process emulates a reward and punishment training method.

Recording the Counts

The counts are held in a random disk file with records of 18 bytes. The first nine bytes hold the configuration, a string of hyphens, O's and X's. The next nine bytes are nine fields, each field containing a count of zero through 255. An initial file is generated by an initialization program, which eliminates invalid end-game conditions for a total of 2423 configurations and the 43,614-byte file of configurations.

The actual tic-tac-toe program draws the diagram, checks for an end condition, and rewards or punishes the tic-tac-toe data in the file as the program learns. Each time the machine plays, a record is made of the entry number and the position in which the response was made. (This corresponds to opening the box in Michie's MENACE.) At the end of the game, each entry is adjusted by adding or subtracting counts from the entry position. Three is added for a win, one is added for a draw, and one is subtracted for a loss. The updated entries for the data are written to disk, so that the data file always reflects the accumulated knowledge of the machine.

A history file is also updated at the end of the game. This file is another random file with one-byte records. For each game, a new letter is added to the end of the file — either a W, D or L.

User Response

Reader response to this project was enthusiastic. The following 25 people volunteered information first:

Heath Dingwell, Litchfield, Connecticut
Tom Seagrove, North Charleston, South Carolina
Daniel Montalvo, Baltimore, Maryland
H.C. Mehlenbacher, Grand Marais, Michigan
John L. Malon, Loring AFB, Maine
Louis Knoepp, Jr., Spartanburg, South Carolina
Russell C. Obbink, Lower Burrell, Pennsylvania
Duane Schwartz, Merrill, Wisconsin
Jim DeStafeno, Wyoming, Delaware
John Stanford, Baldwyn, Mississippi
Steve Ostrom, Minneapolis, Minnesota
William A. Queen III, Bessemer City, North Carolina
Eric Parish, Vista, California
F. Bruhns, Fallbrook, California
Jack Bowman, Jr., Piqua, Ohio
Kevin Sloan, Meridian, Mississippi
Rommel Bruehl, Baton Rouge, Louisiana
Jeff Byers, Creve Coeur, Illinois
John . Collins, Oceanside, California
Clayton B. Shaffer, Visalia, California
Vern Clark, Redondo Beach, California
H.D. Vaughn, Virginia Beach, Virginia
John Marshall, Willits, California
Joel M. DeYoung, Manson, Manitoba
Steven Moreno, Stockton, California

Although I had estimated a month's worth of time to play three or four thousand games, I had underestimated the time lag for mail delivery to a volunteer and back to me. After four months, we had accumulated about 1754 games. However, those games were enough to prove the basic premise — the CoCo can indeed learn to play a reasonable game of tic-tac-toe.

A chronological plot of the first 1754 games is shown in Figure 10. The CoCo's losses were heavy initially, but its wins begin to increase dramatically. Halfway through, the CoCo was winning or drawing over one-half the games. At the end of the 1754 games, the CoCo was winning or drawing about 90 percent of the games played.

If you would like to have the programs and accumulated 1754 games for your own research, they're available. To make it as easy on your columnist as possible, please send a self-addressed envelope with 45 cents postage and a formatted CoCo disk to me at P.O. Box 3568, Mission Viejo, CA 92692.

See you next month with more CoCo topics. ☐

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

Back Issue Availability

For greater convenience, order RAINBOW Back Issues through the Rainbow Magazine Services area of our Delphi CoCo SIG.

BACK ISSUES STILL AVAILABLE

Have you explored the wealth of information in our past issues? From our very first, four-page issue to many with more than 300 pages of material, it's all just for CoCo users — a great way to expand your library!

A WORLD OF INFO AT A BARGAIN PRICE

All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S. Mail. UPS *will not* deliver to a post office box or to another country.

MOST ISSUES STILL AVAILABLE

Issues July 1981 through June 1982 are available on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax. In order to hold down costs, we do not bill, and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last.

To check availability and order, review and fill out the form on the next page and mail it with your payment to:

THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

BACK ISSUE ORDER FORM

(See overleaf for instructions.)

Please send me the following back issues:

MONTH/YEAR		PRICE	
VOLUME 1			
JUL '81	Premier Issue	$2.00	☐
AUG '81		$2.00	☐
SEP '81	Education	$2.00	☐
OCT '81	Printer	$2.00	☐
NOV '81		$2.00	☐
DEC '81	Holiday	$2.00	☐
JAN '82		$2.00	☐
FEB '82		$2.00	☐
MAR '82		$2.50	☐
APR '82		$2.50	☐
JUN '82		$2.50	☐
VOLUME 2			
JUN '83	Printers	$2.95	☐
JUL '83	Anniversary	$2.95	☐
VOLUME 3			
AUG '83	Games	$2.95	☐
SEP '83	Education	$2.95	☐
OCT '83	Graphics	$3.95	☐
DEC '83	Holiday	$3.95	☐
MAR '84	Business	$3.95	☐
APR '84	Gaming	$3.95	☐
MAY '84	Printer	$3.95	☐
JUN '84	Music	$3.95	☐
JUL '84	Anniversary	$3.95	☐
VOLUME 4			
AUG '84	Games	$3.95	☐
SEP '84	Education	$3.95	☐
OCT '84	Graphics	$3.95	☐
NOV '84	Data Comm.	$3.95	☐
DEC '84	Holiday	$3.95	☐
JAN '85	Beginners	$3.95	☐
FEB '85	Utilities	$3.95	☐
MAR '85	Business	$3.95	☐
APR '85	Simulations	$3.95	☐
MAY '85	Printer	$3.95	☐
JUN '85	Music	$3.95	☐
JUL '85	Anniversary	$3.95	☐

MONTH/YEAR		PRICE	
VOLUME 5			
AUG '85	Games	$3.95	☐
SEP '85	Education	$3.95	☐
OCT '85	Graphics	$3.95	☐
NOV '85	Data Comm.	$3.95	☐
JAN '86	Beginners	$3.95	☐
FEB '86	Utilities	$3.95	☐
MAR '86	Business	$3.95	☐
APR '86	Home Help	$3.95	☐
MAY '86	Printer	$3.95	☐
JUN '86	Music	$3.95	☐
JUL '86	Anniversary	$3.95	☐
VOLUME 6			
AUG '86	Games	$3.95	☐
SEP '86	Education	$3.95	☐
OCT '86	Graphics	$3.95	☐
NOV '86	Data Comm.	$3.95	☐
DEC '86	Holiday	$3.95	☐
JAN '87	Beginners	$3.95	☐
FEB '87	Utilities	$3.95	☐
MAR '87	Business	$3.95	☐
APR '87	Home Help	$3.95	☐
MAY '87	Printer	$3.95	☐
JUN '87	Music	$3.95	☐
JUL '87	Anniversary	$3.95	☐
VOLUME 7			
AUG '87	Games	$3.95	☐
SEP '87	Education	$3.95	☐
OCT '87	Graphics	$3.95	☐
NOV '87	Data Comm.	$3.95	☐
DEC '87	Holiday	$3.95	☐
JAN '88	Beginners	$3.95	☐
FEB '88	Utilities	$3.95	☐
MAR '88	Business	$3.95	☐
APR '88	Home Help	$3.95	☐
MAY '88	Printer	$3.95	☐
JUN '88	Music	$3.95	☐
JUL '88	Anniversary	$3.95	☐
VOLUME 8			
AUG '88	Games	$3.95	☐
SEP '88	Education	$3.95	☐
OCT '88	Graphics	$3.95	☐
NOV '88	Data Comm.	$3.95	☐
DEC '88	Holiday	$3.95	☐
JAN '89	Beginners	$3.95	☐
FEB '89	Home Help	$3.95	☐

RAINBOW INDEX A complete index to the first three years, July 1981 through June 1984, is printed in the July 1984 issue. Separate copies are available for $2.50 ☐

The Fourth, Fifth and Sixth Year Indexes including RAINBOW ON TAPE are printed in the July 1985, 1986 and 1987 issues, respectively. The Seventh Year Index is printed in the July 1988 issue.

TOTAL ______

KY RESIDENTS ADD 5% ______

U.S. MAIL CHARGE ______
SHIPPING & HANDLING
U.P.S. CHARGE ______
TOTAL AMOUNT ENCLOSED ______

Article Reprints

In instances where a given issue is now out of print and not available for purchase, we do provide photocopies of specific articles. The cost for this service is $1.50 plus 50 cents S/H per article. This service is provided *only* in the case of out-of-stock issues.

Name ______
Address ______
City ______ State ______ ZIP ______
☐ Payment Enclosed, or
Charge to my: ☐ VISA ☐ MC ☐ AE
CARD # ______
EXPIRATION DATE ______ PHONE ( ) ______
SIGNATURE ______

TO ORDER BY PHONE (credit card orders only) call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

Listing 1: `WORMDRVR`

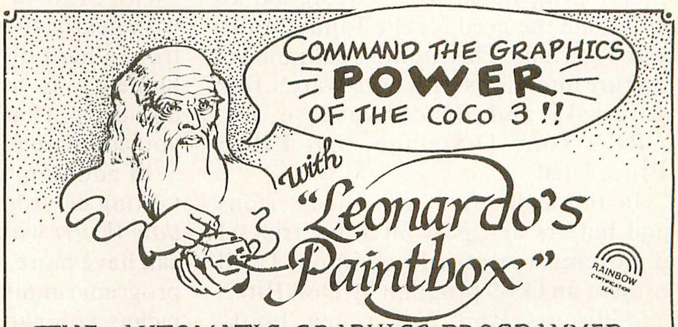
```
100 ' WORM DRIVER PROGRAM FOR CO
CO 1, 2, OR 3 IN 256 BY 192 MODE
110 WIDTH 32
120 PMODE 4,1
130 PCLS 1
140 SCREEN 1,0
150 LINE (0,0)-(255,195),PRESET,
B
160 GOSUB 360
170 IF DI$="U" THEN A$=U$ ELSE I
F DI$="R" THEN A$=R$ ELSE IF DI$
="D" THEN A$=D$      ELSE IF DI$=
"L" THEN A$=L$ ELSE IF DI$="E" T
HEN A$=E$ ELSE IF DI$="F" THEN
     A$=F$ ELSE IF DI$="G" THEN A
$=G$ ELSE A$=H$
180 J=VAL(MID$(A$,1,2))
190 FOR I=1 TO J:ND$=MID$(A$,I*2
+1,1):NF=VAL(MID$(A$,I*2+2,1))
200 IF ND$="U" THEN IF FU>=NF TH
EN XD=0: YD=-1: GOTO 300
210 IF ND$="E" THEN IF FE>=NF TH
EN XD=1: YD=-1: GOTO 300
220 IF ND$="R" THEN IF FR>=NF TH
EN XD=1: YD=0: GOTO 300
230 IF ND$="F" THEN IF FF>=NF TH
EN XD=1: YD=1: GOTO 300
240 IF ND$="D" THEN IF FD>=NF TH
EN XD=0: YD=1: GOTO 300
250 IF ND$="G" THEN IF FG>=NF TH
EN XD=-1: YD=1: GOTO 300
260 IF ND$="L" THEN IF FL>=NF TH
EN XD=-1: YD=0: GOTO 300
270 IF ND$="H" THEN IF FH>=NF TH
EN XD=-1: YD=-1: GOTO 300
280 NEXT
290 XD=0: YD=0
300 DI$=ND$
310 FOR I=1 TO NF
320 X=X+XD: Y=Y+YD
330 PRESET(X,Y)
340 NEXT
350 GOTO 160
360 'FIND FOOD
370 FU=0:FOR I=1 TO LA:YN=Y-I:IF
 YN<1 THEN GOTO 390 ELSE FU=FU+P
POINT(X,YN)
380 NEXT
390 FE=0:FOR I=1 TO LA:XN=X+I:YN
=Y-I:IF (XN>254 OR YN<1) THEN GO
TO 410 ELSE FE=      FE+PPOINT(XN
,YN)
400 NEXT
410 FR=0:FOR I=1 TO LA:XN=X+I:IF
 X>254 THEN GOTO 430 ELSE FR=FR+
PPOINT(XN,Y)
420 NEXT
430 FF=0:FOR I=1 TO LA:XN=X+I:YN
=Y+I:IF (XN>254 OR YN>190) THEN
```

```
GOTO 450 ELSE          FF=FF+PPOINT
(XN,YN)
440 NEXT
450 FD=0:FOR I=1 TO LA:YN=Y+I:IF
 Y>190 THEN GOTO 470 ELSE FD=FD+
PPOINT(X,YN)
460 NEXT
470 FG=0:FOR I=1 TO LA:XN=X-I:YN
=Y+I:IF (XN<1 OR YN>190) THEN GO
TO 490 ELSE FG=      FG+PPOINT(XN
,YN)
```

```
480 NEXT
490 FL=0:FOR I=1 TO LA:XN=X-I:IF
 XN<1 THEN GOTO 510 ELSE FL=FL+P
POINT(XN,Y)
500 NEXT
510 FH=0:FOR I=1 TO LA:XN=X-I:YN
=Y-I:IF (XN<1 OR YN<1) THEN GOTO
 530 ELSE FH=FH+      PPOINT(XN,YN
)
520 NEXT
530 RETURN
```

Listing 2: WORMSMPL

```
10 'SRL WORM
11 X=128: Y=96
12 LA=1
13 U$="03U1R1L1": R$="03R1D1U1":
 D$="03D1L1R1": L$="03L1U1D1"
14 DI$="U"
15 'MERGE WORM DRIVER HERE
16 '
20 'RLS WORM
21 X=128: Y=96
22 LA=1
23 U$="03R1U1L1": R$="03D1R1U1":
 D$="03L1D1R1": L$="03U1L1D1"
24 DI$="U"
25 'MERGE WORM DRIVER HERE
26 '
30 'RSL WORM
31 X=128: Y=96
32 LA=1
33 U$="03R1U1L1": R$="03D1R1U1":
 D$="03L1D1R1": L$="03U1L1D1"
34 DI$="U"
35 'MERGE WORM DRIVER HERE
36 '
40 'NINE PIXEL RLS WORM
41 X=128: Y=96
42 LA=9
43 U$="03R9L9U9": R$="03D9U9R9":
 D$="03L9R9D9": L$="03U9D9L9"
44 DI$="U"
45 'MERGE WORM DRIVER HERE
46 '
50 'NINE PIXEL RLS WORM
51 X=128: Y=96
52 LA=9
53 U$="03R9U9L9": R$="03D9R9U9":
 D$="03L9D9R9": L$="03U9L9D9"
54 DI$="U"
55 'MERGE WORM DRIVER HERE
56 '
60 'EHS OCTAGONAL WORM
61 LA=5
62 X=20: Y=96
63 U$="03E5H5U5": R$="03F5E5R5":
 D$="03G5F5D5": L$="03H5G5L5"
64 E$="03R5U5E5": F$="03D5R5F5":
 G$="03L5D5G5": H$="03U5L5H5"
65 DI$="E"
66 'MERGE WORM DRIVER HERE
67 '
70 'ERFDGLH OCTAGONAL WORM
71 LA=5
72 X=128: Y=96
73 U$="07E5R5F5D5G5L5H5": R$="07
F5D5G5L5H5U5E5": D$="07G5L5H5U5E
5R5F5":                  L$="07H5U5E5R
5F5D5G5"
74 E$="07R5F5D5G5L5H5U5": F$="07
D5G5L5H5U5E5R5": G$="07L5H5U5E5R
5F5D5":                  H$="07U5R5F5D
5G5L5"
75 DI$="E"
76 'MERGE WORM DRIVER HERE
77 '
```


COMMAND THE GRAPHICS POWER OF THE CoCo 3!!
with "Leonardo's Paintbox"
RAINBOW CERTIFICATION SEAL

THE AUTOMATIC GRAPHICS PROGRAMMER
Actually writes graphics programs!!!
Simply use a joystick to pick from 64 colors, draw, paint, & even add pixel-by-pixel detail! Then give the command to SAVE a short routine that recreates your graphic exactly as you did it originally (only much faster)! Do all kinds of graphics, titles, diagrams which can be merged into your programs or used alone! For CoCo 3 with disk & self-centering joystick.
Reg $29.95 Special intro price $26.95 + S/H!

E-Z FRIENDLY
118 Corlies Avenue
Poughkeepsie, NY 12601
(914) 485-8150

$1.50 S/H ON ALL ORDERS
NY RESIDENTS INCLUDE SALES TAX

KISSable OS-9

Advances in OS-9 Technology

By Dale L. Puckett
Rainbow Contributing Editor

I noticed several exciting advances in both hardware and software at Princeton's RAINBOWfest. While Owl-Ware's *Window Writer* offered the most sophisticated advances in OS-9 software, Tony Distefano (CRC/Disto) and Bruce Isted (FHL) presented their latest plug-in cards — designed to eliminate the need for the Tandy Multi-Pak Interface. This month's column will feature interviews with Owl-Ware's Tom Roginski and Bruce Navarre, Jr., CRC's Tony DiStefano, and FHL's Bruce Isted.

In this column, I will discuss icons and buffers and pass on a few tricks I discovered recently. In addition, I will present an OS-9 program by Don Hitko and discuss Paul Ward's new book, *Start OS-9*.

Window Writer on the Way

Tom Roginski at Owl-Ware heard about *Window Writer* last February when he received the first version in the mail from Rojah (pronounced Roger) Dash at RAM International, Inc. Dash is a Chicago-area OS-9 user. A college student at the University of Illinois, Dash visited Roginski in the Spring and brought another early version with him. Roginski was impressed with the word processor's speed and its ability to run effectively on a floppy disk, a hard drive or a RAM disk. Roginski explained, "With 512K of memory, you can work with nearly 40 pages of text. If you run from a hard drive, the size of the file is limited only by the size of your hard disk drive. That's impressive, even when you compare it to IBM standards."

In addition, thanks to OS-9's multitasking environment, if you start *Window Writer* with multiple windows, you can have more than one iteration of the program running at the same time. This means you can edit two files at once, moving back and forth between the windows — cutting and pasting between the two versions of your prose along the way. You can do this because *Window Writer* maintains a common buffer — a clipboard of sorts — that makes it possible.

Roginski had nothing but praise for Dash's efforts. He compared the system to several popular word processors running in the IBM and Macintosh environments. Roginski had obtained the early beta release only a week before he came to RAINBOWfest, but he was planning a production release in early 1989. He said the users guide would be laser printed. The program will sell for $59, but Roginski plans to introduce it at a special price of $49. *Window Writer* will work with both *TS Spell* and *DynaSpell* and comes with a large selection of configuration files that match it to most popular printers.

Bruce Navarre, Jr., the Chief Technician at Owl-Ware, has also worked with *Window Writer* since February 1988. He believes that the system compares to the best MS-DOS word processors on the market. It has all the popular features built in, including support for a laser printer.

The first version of *Window Writer* doesn't support graphics, but Roginski says Dash is working on it. He told us that Dash's ultimate goal was to put out something comparable to the latest version of *WordPerfect*. That's a lofty goal and one that will be a true challenge on the 6809-based Color Computer. Roginski says the big disadvantage of graphics-based word processors centers on the limitations of their printed resolution. However, *Window Writer*'s pull-down menus can use the cursor control keys or the mouse.

Dash's word processor uses a built-in map that lets you set up the special codes needed by your printer. You can determine the form in which your text will be printed by glancing at the screen. While the approach is not pure WYSIWYG, it does use characters of various colors to indicate what the final print looks like. When using *Window Writer*, you enter a single character. The printer driver translates it to the right code sequence for your printer.

While Roginski works with both the Color Computer and the IBM crowd, Navarre spends all of his time helping Color Computer users. I asked Navarre

---

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP: on packet-radio, K0HYD @ N4QQ; on GEnie, D.PUCKETT2; and on CIS, 71446,736.

why Owl-Ware was making such a big investment in OS-9 Level II software. Navarre explained, "We felt we needed to do something to help our users reach the potential of the more expensive software packages running on other computers like the IBM PC and Macintosh. OS-9 makes it possible to do this kind of program, but no one has made the investment needed to pull it off." Navarre believes that in the past most third-party vendors could not afford the time or the money to effectively use the OS-9 environment.

As a student, Dash has been able to invest more than a year on *Window Writer.* Navarre said that Dash came to Owl-Ware because he had seen its ads for years and wanted the company to market his product. *Window Writer* was developed in BASIC09; however, Dash used assembly language subroutines where speed is needed. The program was written on a standard Color Computer 3.

"One of the biggest problems I've run into as a software publisher is that you cannot buy a run-time OS-9 Level II package," Roginski said. "For a time, you could do this with OS-9 Level I software. I believe that OS-9 is going to die undeveloped because programmers are unable to produce a program that will run out of the box. I almost made the decision not to market this software package because of this problem."

Both Roginski and Navarre support OS-9. Roginski feels that OS-9 helped him learn MS-DOS without the expected problems. In addition, OS-9 is a more powerful operating system than Disk BASIC.

Navarre believes that the OS-9 market is growing and that most users who are serious about the Color Computer are now using this system. "In the last year, the interest in our OS-9 programs has tripled," Navarre said. "It's still not a high percentage of the Color Computer market, but that goes right back to the need to be able to buy software that runs out of the box.

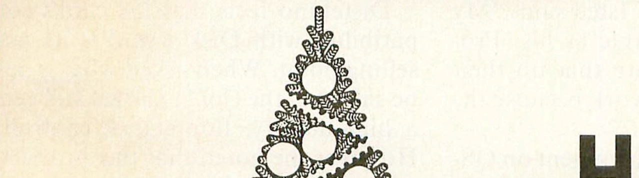
"The knowledge our Color Computer users have is incredible. When I first came to Owl-Ware, Tom said, 'you will learn OS-9.' Before long, I had picked it up and was put in charge of the LR Tech hard-drive support. OS-9 unleashes the power of the Color Computer. CoCo doesn't have nearly as much power under Disk BASIC."

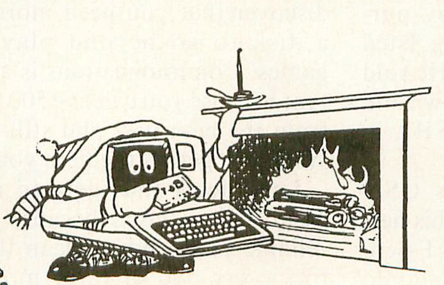
Some of Roginski's customers are testing the beta version of *Window Writer*, and he is asking them for suggestions regarding features and improvements. I also had the opportunity to work with the program for several hours before I started this column.

My initial reaction? Dash is on the right track with *Window Writer.* Since I use *MS Word* at work, I noticed several actions that were not as intuitive as they should be. I also suggested that Dash make his menu interface work the same as all other *Multi-Vue*-based programs and cautioned him to follow OS-9's rules religiously to avoid any problems that might occur in a multitasking environment. I also suggested he make it possible for two edit windows to be open in the same screen. That enhancement alone would make a cut-and-paste editor's day. If these guys take these suggestions to heart and continue to enhance the program after its release, *Window Writer* may be the OS-9 word processor we've all been waiting for.

On the Hardware Front

While Roginski and Navarre were busy telling RAINBOWfest visitors about *Window Writer*, Bruce Isted and





A GREAT HOLIDAY GIFT!

Get 12 Disks or Tapes a year containing over 120 quality programs. A subscription to T & D Software consists of 10 ready-to-run programs delivered first class mail every month.

PRICES

	Tape or Disk	Holiday Savings
2 Years	~~$140.00~~	$100.00
1 Year	~~70.00~~	60.00
6 mo's	~~40.00~~	35.00

HOLIDAY BONUS: Subscribe for a year, receive our latest 2 Back Issues FREE! Subscribe for 2 years, receive 4 FREE!

★ COCO 1, 2, and 3
★ Includes Documentation
★ Please Specify Tape or Disk

RAINBOW CERTIFICATION SEAL

VISA MasterCard

T & D SUBSCRIPTION SOFTWARE, 2490 MILES STANDISH DR., HOLLAND, MI 49424 (616) 399-9648

Tony DiStefano were busy talking about the new hardware add-ons they had completed. I talked to Isted first as he presented his new Eliminator card at the FHL booth.

Bruce Isted hails from Calgary, Alberta, and works for Madis Engineering. These days, he stays busy keeping the company's computers running. He also designs circuits and OS-9 software used in many microcontroller applications. His products are found in monitor stations used by security companies, burglar alarms, phone dialers and radio alarms. He builds real-time applications, and that's why he likes OS-9. Isted has worked with OS-9 for about five years and has started doing some design work for the Color Computer.

"I guess you could say it's gone beyond a hobby, but it's not yet a business," he said. To produce his existing hard-disk interface, Isted has the circuit boards etched and then builds the units himself. He has the market cornered, from soldering to marketing. When his new Eliminator card reaches the market, he hopes to farm out the board assembly. Isted saw a lot of interest at Princeton. Many people filled out tentative order forms, and he will get in touch with them when the board is ready.

Isted's first commercial product was the hard-disk controller. He started that project because his Pro System hard disk wouldn't work on the Color Computer 3. He decided to make it work, and a new hard disk interface was born. Isted designed his own interface because he wanted one controller to run his hard disk and floppy disks in a no-halt mode. After he had his new design working, he sold it to people with Pro System hard disks who wanted more from the system. Then, when Dennis Welby purchased one, he called Frank Hogg. Isted has been in business ever since. He sold the controllers for a year on his own and then began shipping them to FHL in early January, 1988.

Isted wrote The Eliminator's OS-9 software himself. The name for his new product was Frank Hogg's idea. Essentially, Hogg thinks Isted's card should eliminate the need for a Multi-Pak Interface. It features a hard disk interface, a real-time clock, parallel printer, two serial ports and an EPROM socket for booting automatically to OS-9. You can also plug in a Disk BASIC-compatible ROM if you like.

Isted had The Eliminator working at Princeton, but he felt it still needed some polish. The only comparable interface card is the Four-in-One from CRC, which provides identical functions but has one serial port instead of two. Because it is an expansion card that plugs on top of the Disto Super Controller II, it uses separate floppy- and hard-disk controllers. Isted said that DiStefano has an advantage here because the regular floppy controller lets you use all available Disk BASIC-based software.

"Anyone just starting with the Color Computer will discover that you need more than just a disk to go beyond playing a few games."

"Regardless of what his ROM does, if a Disk BASIC program disk is plugged in, it is going to work," Isted said. "My card is not as compatible as his. Programs like *VIP* software that do their own disk I/O will not work because the controllers are different."

I then asked Isted to comment on OS-9 in general. "I think the new Four-in-One controller and The Eliminator are necessary for the Color Computer to keep growing because there's no longer a Multi-Pak," he said. "Anyone just starting with the Color Computer will discover that you need more than just a disk to go beyond playing a few games. Communications is also important because you can live 500 miles away from the next user and still use a BBS system to get all the help you need."

Isted feels that getting rid of the Multi-Pak is good because to keep it reliable you need to clean the connectors every two or three months. Both new cards eliminate the need for slot switching. The Multi-Pak had the cartridge interrupts separated. To use more than one card that generates an interrupt, you had to modify the Multi-Pak. With the new all-in-one cards, you can have all of the devices on the card interrupt driven. This is important especially when dealing with communications.

Disto Four-in-One Card

"By 1995, I should have 11 devices on a card," Tony DiStefano said with a slight grin. "Don't call to ask when the CoCo-on-a-card will be ready until 1994." Disto's Three-in-One card is already out. It features a serial port, parallel port and a real-time clock. Tony was selling it at the CRC booth at Princeton, and it had a good reception. When I asked DiStefano to list the advantages of his Four-in-One card, he said that it gives the Color Computer something it wasn't born with. Its four devices deliver the capabilities needed under OS-9.

All of the new devices work well at the Color Computer 3's 2MHz clock speed. This was a problem with some of the older clocks, which had been designed for the CoCo 2. The Three-in-One cards sold for $55 at Princeton. Their regular price will run $60 to $65. The exact price of the Four-in-One card isn't known at present, but Tony expects it to be under $100. The Four-in-One card has everything found in the Three-in-One card and a hard-disk adapter. Its beta-test copy caused a stir at Princeton. DiStefano believes that his new card is everything you need. He promises the card will be out before you read this column.

Distefano feels that his card's compatibility with Disk BASIC is its main selling point. When asked what is next, he said that the CoCo market still needs a high-density, floppy-disk controller. However, he noted that this product is still on the drawing board.

Displaying Icons

Radio buttons are becoming more common as the visual interface in new software today. These buttons highlight an area on the screen and show us where to push the mouse button when we want to start an action. At first, the action we expected when we pushed the button was printed on the button itself in plain English. Today, however, many of the buttons take the shape of an intuitive icon that describes without words the action initiated by the button. Some contain both a picture and a word or two.

One day while thinking about the design of a new piece of software, I considered using graphic icons as buttons that would let me navigate through the program visually. This led to a logical question: How could I display an icon as a radio button? Research began immediately.

I decided to first determine how

Multi-Vue's standard icons could be displayed on an OS-9 graphics window. Several public-domain icon editors are available on Delphi, CompuServe and GEnie, in addition to those found on many local Color Computer BBSs. If I could display these standard icons, I could create my own radio button icons with the standard-icon editors and let the program display them in the proper window at the proper time.

I had wondered about this problem before, but — as usual — need was the mother of invention. I found that there are system calls built into OS-9 that do what I wanted. And fortunately, I found that I could make these calls by sending the proper series of display codes to the window or screen in question.

My first problem was to find the proper display codes, so I looked up *icon* in the index to the Windowing section of OS-9's technical reference manual — the last section of the 3-inch-thick documentation supplied with OS-9 Level II. Unfortunately, that wasn't the place to look. I found the answer under `PutBlk` — OS-9's name for the Put Block system call. Before I solved that puzzle, I had looked under `GPLoad` (Get/Put Buffer Load), and `KilBuf` (Kill Get/Put Buffer).

The `PutBlk` system call is used to move a bit pattern from a buffer used internally by OS-9 to your Color Computer screen. But before you can move a bit pattern to the screen, you must create a buffer and load it with the graphics images you want to display. This can be accomplished by creating a buffer and moving a bit pattern from the screen into the buffer or by loading a bit pattern from a file into a buffer. Since my goal was to display the bit pattern stored in the standard icon files, I took the second approach.

A Step-by-Step Approach

Once I located the proper section of the OS-9 manual, I began to experiment. When I started, my `/term` device was a 40-column text window. I also had another Shell running in Window Device `/w7` — an 80-column text window. My first step was to create a graphics window where I could run some tests. I had set up Window Device `/w4` with the `Iniz` utility by including the line `iniz w4` in the startup file. I then started a Shell in that window by typing `shell i=/W4&`.

Because I used the standard window device descriptors supplied with OS-9 Level II's production copy, my Shell appeared in a small window in the upper-left corner of a new screen. My next step was to turn that small window into an 80-by-24, four-color (Type 7) graphics window. To do this, I used the CLEAR key to move to that window and typed `merge /dd/mgw4`. The desired screen popped into place as the `Merge` utility finished its work.

Once I had a proper graphics screen, I loaded an icon into an OS-9 buffer. I then entered a command line like the following:

```
display 1b2b 50 1 7 0018 0018 1fff ;
merge /dd/cmds/icons/icon.telecom
```

In this command line, `Display` is the standard OS-9 utility command used to send non-printing characters to a window or other device. The Hex code `1b2b` means `GPLoad` (Get/Put Buffer Load) to OS-9. Next, the parameters needed by `GPLoad` include the buffer's group number, 50, and the buffer number, 1. I used a Type 7 window to get an 80-by-24 screen with four colors. As defined in the command line, the icon is an 18-by-18-hex square.

NEW FOR OS-9™: *FORTH09* ™

from D. P. JOHNSON

FORTH09 is a FORTH-83 Standard implementation specially taylored for OS-9. Includes the double number extension word set, system extension word set, complete forth 6809 assembler and more. Programs written in forth can instantly be saved as compact executable machine language modules. The FORTH09 system runs on any level I or level II OS-9 (6809) machine with at least 32k of available memory and one disk drive. Saved Forth09 application code is romable, reentrant and fully position independent, requiring as little as 3k for a small program. Where maximum speed is required the user can force small code words to be automatically compiled as in line code rather than subroutines. Supplied with complete printed documentation. **$150.00** (+ $3 S&H) Specify disk format if other than CoCo OS-9 format desired.

Other OS-9 SOFTWARE from D. P. JOHNSON

L1 UTILITY PAK - Contains 40 useful utilities that run under both level I and II OS-9. Included are a complete set of "wild card" file handling utilities, a disassembler, a disk sector editor, and the MacGen command language compiler. MacGen will allow you to generate many useful command macros in minutes, much more useful than procedure files. Macro source is included for a macro to implement an archival backup type function. **$49.95**

L2 UTILITY PAK - Contains a Level II "printerr" function that also **shows the pathname being searched for** when "not found" or permission type errors occur. Also contains level II software ram disk driver. Ten other utilities included, some useful for level I also. **$39.95**

L1+L2 COMBINATION PAK both of above together for **$75.00**

SDISK - Standard disk driver module replacement allows full use of 40 or 80 track double sided drives with OS-9 Level I. Full compatibility with CoCo 35 track format and access all other OS-9 non-CoCo formats. Easy installation. **$29.95**

SDISK+BOOTFIX - As above plus boot directly from a double sided diskette. **$35.95**

SDISK3 - Level II version of SDISK driver. Same features as level I (except bootfix not required to boot from double sided). **$29.95**

PC-XFER UTILITIES - Programs to format and transfer files to/from MS-DOS™ diskettes on CoCo under OS-9. (Requires either SDISK or SDISK3 to run depending on which level of OS-9 you are using) **$45.00**

MSF - MS-DOS disk format file manager. More complete file transfer capabiltites for level II only. (Requires SDISK3 to operate).
Now supports 720K 5-1/4" and 3-1/2" MS-DOS Formats. **$45.00** MSF+SDISK3 together **$65.00**

All diskettes are in CoCo OS-9 format unless otherwise requested; other OS-9 formats can be supplied for $2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add $1.75 S&H for first software item, + .25 for each additional item, additional charge for COD.

D. P. Johnson, 7655 S.W. Cedarcrest St., Portland, OR 97223 (503) 244-8152 (For best service call between 9-11 AM Pacific Time, Mon.-Fri.)

OS-9 is a trademark of Microware and Motorola Inc., MS-DOS is a trademark of Microsoft, Inc., FORTH09 is a trademark of D. P. Johnson

On this command line, I reserved 8K of memory for the buffer — enough to store 56 icons. The following table lists the values and their abbreviations used in my `Display` command line:

Code = 1b2b
GRP = 50
BFN = 1
STY = 7
HSX = 00
LSX = 18
HSY = 00
LSY = 18
HBL = 1f
LBL = ff

The second half of the command line merged the data that describes (draws) the icon on the screen into the buffer.

The buffer group number for this experiment was chosen at random. If you use these techniques in an actual program, you must make the proper OS-9 system call to get the process number for your program and use *this* number as the *group* number. Because OS-9 allows only one process to run at a given time for each finite process number, this technique avoids problems that occur when more than one user is logged on to your computer at one time. In other words, if two people try to create a Buffer Group Number 50, the second person will get an error message.

Your experiments here will work best if you take advantage of your ability to issue more than one command on the same line in OS-9. When you use two commands on the same line, OS-9 merges the icon data stored in the file `icon.telecom` (make sure that an icon file with the name you type exists) with the preliminary data issued by the display command. When you issue the commands as shown in the sample line, the result will be a buffer in memory with the Group Number 50 and a bit pattern in which the Buffer Number 1 is stored.

If you press ENTER after you type the first half of the command line, you can run into problems. The only way to recover is to go to another window and issue the merge command while redirecting its output to Window Device `/w4`. However, you can only do this if you are running the OS-9 Users Group's *Shell+* Version 2.0 or later, which has a special no-block mode. You can break the command line into two separate lines if you run them from an OS-9 procedure file. The method used in the example above is the easiest however.

If you accidentally press ENTER, the easiest thing to do is to use the CLEAR key to move to another window where *Shell* is running. Once there, you can kill the Shell in which you were experimenting. You can then `deiniz` the window, run `iniz` again and start another Shell. This is the easiest way to get out of this trap.

"Your experiments here will work best if you take advantage of your ability to issue more than one command on the same line in OS-9."

Printing the Icon

Now that you have the image of an icon loaded into your buffer, you can print it to your screen. To do this, use the following command line:

```
display 1b 2d 50 1 0050 0050
```

In this command line, `1b2d` means `PutBlk` to OS-9. While the 50 and the 1 point to the buffer group and group number created above, the 0050 tells OS-9 where to print the icon on your screen. This command line will place the icon 80 pixels — 50 Hex — to the right and 80 pixels down from the upper-left corner of your screen. You may load more than one icon or other graphics image into a buffer as long as you give each one a unique buffer number and have enough room in the buffer. That's why I made the buffer 8K long in the first command line.

If you do have more than one image loaded into your buffer, you can use the same command line to display all of them at one time. To do this, type something like the following:

```
display 1b2d 50 1 0050 0050 1b2d 50 2
0080 0050 1b2d 50 3 00b0 0050
```

Now that you know the secret to printing an icon on your Color Computer screen, I hope you'll take some time to experiment with your own icons. You'll soon have an incentive to download one of the public domain icon editors, so you can create your own. The next step will be to let OS-9 know when someone has punched the mouse button while the pointer was over the icon. Sound like fun?

Charter

This month's listing was contributed by Don Hitko of Burton, Michigan. Hitko wrote a BASIC09 program, *Charter*, that adds to the functionality of the *Scratch Pad* screen editor written by Peter Dibble for *The Complete Rainbow Guide to OS-9 Level II: A Beginner's Guide to Windows*. The program uses two *Scratch Pad* modules, `ReadFile` and `ClearBuf`.

To run the program, load the four procedures into BASIC09 and enter `run charter`. You can also pack and merge the files to run them from the OS-9 command line. You can adapt Don's listing to your own printer by changing the data lines in the listing. He submitted it as an "idea starter," hoping you may get some enjoyment and educational benefit from it. Thanks, Don.

Don does caution you to start printing a long document before you go to bed. "It may be done before you wake," he quipped.

Start OS-9

Paul Ward introduced a new book designed for OS-9 beginners at the October RAINBOWfest. His book, *Start OS-9*, contains many tutorials and several useful essays. It comes with a disk containing a number of Steve Goldberg's excellent OS-9 utility programs. Paul called today to say that people who bought the preliminary copies at Princeton can get a copy of the final printing by sending him $10 plus $2.50 for postage and handling.

As I close this month's column, here's the latest on *Shell+*. Ron Lammardo was distributing copies of Version 2.1 at RAINBOWfest. In the not-too-distant future Ron hopes to add an environment file to *Shell+* like the one used by *Multi-Vue*. He is also planning a new version that would use `Get/Put` buffers to store all the *Shell+* variables. The buffers would make *Shell+* variables global.

That's it for another month. Enjoy your experiments with OS-9's `Get/Put` buffers while I think up something neat for March. ☐

Listing 1: `Charter`

```
PROCEDURE charter
 0000      BASE 1
 0002      DIM ScreenData(100):STRING[80]
 0013      DIM filename,cur_line:STRING[80]
 0023      DIM cur_let:STRING[1]
 002F      DIM line,letter,printer:INTEGER
 003E
 003F      PRINT "Enter the pathlist of the file to use:"
 0069      INPUT filename
 006E      RUN ReadFile(filename,ScreenData)
 007D
 007E      OPEN #printer,"/p"
 0089      PRINT #printer,CHR$($1B)+CHR$($1C);
 009A
 009B      FOR line:=1 TO 100
 00AB        cur_line:=ScreenData(line)
 00B6        FOR letter:=1 TO 80
 00C6          cur_let:=MID$(cur_line,letter,1)
 00D4          RUN translate(cur_let)
 00DE          PRINT #printer,cur_let;
 00E9        NEXT letter
 00F4      NEXT line
 00FF
 0100      CLOSE #printer
 0106      END
```

Listing 2: `Translate`

```
PROCEDURE translate
 0000      PARAM cur_let:STRING[1]
 000C      DIM char:STRING[1]
 0018      DIM printer2,counter,number:INTEGER
 0027
 0028      OPEN #printer2,"/p"
 0033      IF cur_let="b" THEN
 0040        PRINT #printer2,CHR$($1B)+CHR$($1F);
 0051      ELSE IF cur_let="c" THEN
 0061          PRINT #printer2,CHR$($1B)+CHR$($20);
 0072        ELSE IF cur_let="e" THEN
 0082            PRINT #printer2,CHR$($1B)+CHR$($0E);
 0093          ELSE IF cur_let="f" THEN
 00A3              PRINT #printer2,CHR$($1B)+CHR$($0F);
 00B4            ELSE ENDIF
 00B9          ENDIF
 00BB        ENDIF
 00BD      ENDIF
 00BF      IF cur_let="b" OR cur_let="c" OR cur_let="e" OR cur_let="f"

            THEN
 00E4        cur_let:=" "
 00EC      ELSE ENDIF
 00F1      CLOSE #printer2
 00F7
 00F8      IF ASC(cur_let)<91 AND ASC(cur_let)>45 THEN END
 010E      ELSE ENDIF
 0113
 0114      FOR counter:=1 TO 31
 0124        READ char
 0129        READ number
 012E        IF cur_let=char THEN
 013B          cur_let:=CHR$(number)
 0144        ELSE ENDIF
 0149      NEXT counter
 0154      RESTORE
 0156      END
 0158
 0159      DATA "i",224,"j",225,"k",226,"l",227
 0179      DATA "m",228,"n",229,"o",230,"p",231
 0199      DATA "q",232,"r",233,"s",234,"t",235
 01B9      DATA "u",236,"w",237,"x",238,"#",239
 01D9      DATA "[",240,"-",241,"]",242,"v",243
 01F9      DATA "}",244,"|",245,"(",246,")",247
 0219      DATA "^",248,"{",249,"+",250,"g",251
 0239      DATA "h",252,"y",253,"z",254
```

PERRY COMPUTERS
The Ideal Buy
1-800-248-3823

TANDY COMPUTERS

Tandy 1000-HX 256K 5 1/4"D.	535.00
Tandy 1000-SL 384K 5 1/4"D.	675.00
Tandy 1000-TL 640K 3 1/2"D.	955.00
Tandy 3000-NL 512K 3 1/2"D.	1275.00
Tandy 4000-LX 2 Meg 3 1/2"D.	2999.00
Tandy 4000 1 Meg 3 1/2" D.	1890.00
Tandy 5000MC 2 Meg 1 Drive	3825.00
Tandy 5000MC 2 Meg 40 Meg	4955.00
Tandy 5000MC 2 Meg 84 Meg	5395.00
Tandy 1400LT 768K 2 Drives	1335.00
Tandy 102 24K	430.00
Tandy Color 3 128K	155.00

MONITORS & BOARDS

VM-4 Monochrome Green	95.00
VM-5 Monochrome Green	115.00
CM-5 Color RGB	220.00
CM-11 Color RGB	315.00
EGM-1 Color RGB (EGA)	510.00
VGM-100 Monochrome Analog	169.00
VGM-200 Color Analog	425.00
VGM-300 Color Analog	535.00
Video 7 Vega Deluxe Card	230.00
Video 7 Vega Vga Card	295.00
Tandy EGA Card	205.00
Paradise Basic EGA Card	185.00

DRIVES

Color Computer Drive 0	175.00
5 1/4" External Drive 1000EX	180.00
Tandy 20 Meg Hardcard	450.00
30 Meg Hardcard	395.00
20 Meg Hard Drive 1400LT	775.00
5 1/4" External for Tandy 1400	215.00
Seagate 20 Meg Hard Drive	219.00
Tandy 1000/SX/TX Controller	69.00

ZUCKER BOARDS

Zucker Serial Board	45.00
Zucker 0K Memory Board 1000	45.00
Zucker MFB 0K for 1000	106.00
Zucker 1200 Baud Modem Card	75.00

PRINTERS

DMP-106 Dot-Matrix	165.00
DMP-132 Dot-Matrix	285.00
DWP-230 Daisy Wheel	345.00
Panasonic KX-P1080I Dot-Matrix	179.00
Panasonic KX-P1091I Dot-Matrix	199.00
Panasonic KX-P1092I Dot-Matrix	349.00
Panasonic KX-P1124 Dot-Matrix	369.00
Panasonic KX-P1524 Dot-Matrix	595.00

Please write for complete price list.
We carry more items than listed here.

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted add 2% (minimum charge $10.00). M.C., Visa add 2%. All non defective items require return merchandise authorization. Call for RMA Number before returning. Delivery is subject to product availability. Add 1½% for shipping and handling, $5.00 minimum charge.

TM - Registered Trademark of Tandy, Epson, and IBM

Monday thru Friday 9am - 5pm EST.

PERRY COMPUTERS
124 South Main Street, Perry, MI 48872
CALL 1-517-625-4161 or TOLL-FREE
1-800-248-3823

Racksellers

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA

Birmingham	Jefferson News Co.
Brewton	McDowell Electronics
Florence	Anderson News Co.
Greenville	M & B Electronics
Madison	Madison Books
Montgomery	Trade 'N' Books
Tuscaloosa	Injun John's, Inc.

ALASKA

Fairbanks	Arrow Appliance/Radio Shack

ARIZONA

Cottonwood	A & W Graphics Co.
Lake Havasu City	Book Nook
Phoenix	TRI-TEK Computers
Tempe	Books, Etc.
	Computer Library
Tucson	Anderson News Co.

ARKANSAS

Fayetteville	Vaughn Electronics/Radio Shack
Ft. Smith	Hot Off the Press Newsstand
Little Rock	Anderson News Co.

CALIFORNIA

Berkeley	Lyon Enterprises
Citrus Heights	Software Plus
Hollywood	Levity Distributors
	Stef-Jen, Inc.
La Jolla	Butler & Mayes Booksellers
Los Angeles	Circus of Books (2 Locations)
Marysville	Bookland
Napa	Bookends Bookstore
Oakland	DeLauer's News Agency
Rancho Murieta	Software Plus
Sacramento	Deibert's Readerama
	Tower Magazine
San Francisco	Booksmith
	Bookworks
	Castro Kiosk
Santa Monica	Midnight Special Bookstore
San Jose	Computer Literacy Bookshops
Santa Rosa	Sawyer's News, Inc.
Stockton	Harding Way News
	Paperbacks Unlimited
Sunnyvale	Computer Literacy
Torrance	El Camino College Bookstore

COLORADO

Aurora	Aurora Newsstand
Colorado Springs	Hathaway's
Denver	News Gallery
Glenwood Springs	The Book Train
Grand Junction	Readmore Book & Magazine
Longmont	City Newsstand

DELAWARE

Middletown	Delmar Co.
Newark	Newark Newsstand
Wilmington	Normar, Inc.—The Smoke Shop

DISTRICT OF COLUMBIA

Washington, DC	Chronichles
	News Room
	World News, Inc.

FLORIDA

Boca Raton	Great American Book Co.
Clearwater	The Avid Reader
Cocoa	The Open Door
Dania	Dania News & Books
Davie	Software Plus More
Ft. Lauderdale	Bob's News & Book-Store
	Clarks Out of Town News
	Mike's Electronics Distributor
Gainesville	Paper Chase
Jacksonville	Book Co.
North Miami Beach	Almar Bookstore
Panama City	Boyd-Ebert Corp.
Pensacola	Anderson News Co.
Pinellas Park	Wolf's Newsstand
South Pasadena	Poling Place Bookstore
Starke	Record Junction, Inc.
	Radio Shack Dealer
Sunrise	Sunny's at Sunset
Tallahassee	Anderson News Co.
	DuBey's News Center
Titusville	Computrac

GEORGIA

Atlanta	Border's
Bremen	Bremen Electronics/Radio Shack
Forest Park	Ellers News Center
Jesup	Radio Shack
Thomasville	Smokehouse Newsstand
Toccoa	Martin Music Radio Shack

IDAHO

Boise	Book Shelf, Inc.
Moscow	Johnson News Agency

ILLINOIS

Belleville	Software or Systems
Champaign	Bookmark
Chicago	B. Dalton Booksellers
Decatur	Book Emporium
	K-Mart Plaza
	Northgate Mall
East Moline	Book Emporium
Evanston	Norris Center Bookstore
Kewanee	Book Emporium
Lisle	Book Nook
Lombard	Empire Periodicals
Newton	Bill's TV Radio Shack
Paris	Book Emporium
Peoria	Book Emporium
	Sheridan Village
	Westlake Shopping Center
	Illinois News Service
Springfield	Book Emporium
	Sangamon Center North
	Town & Country Shopping Ctr.
Sunnyland	Book Emporium
West Frankfort	Paper Place
Wheeling	North Shore Distributors

INDIANA

Angola	D & D Electronics
	Radio Shack
Berne	White Cottage Electronics
Bloomington	Book Corner
Columbus	Micro Computer Systems, Inc.
Crawfordsville	Koch's Books
Dyer	Miles Books
Franklin	Gallery Book Shop
Ft. Wayne	Michiana News Service
Garrett	Finn News Agency, Inc.
Indianapolis	Bookland, Inc.
	Borders Bookshop
	Indiana News
	Southside News
Lebanon	Gallery Book Shop
Martinsville	Radio Shack
Richmond	Voyles News Agency, Inc.
Wabash	Mitting's Electronics

IOWA

Davenport	Interstate Book Store
Des Moines	Thackery's Books, Inc.
Fairfield	Kramers Books & Gifts

KANSAS

Hutchinson	Crossroads, Inc.
Topeka	Palmer News, Inc.
	Town Crier of Topeka, Inc.
Wellington	Dandy's/Radio Shack Dealer
Wichita	Lloyd's Radio

KENTUCKY

Hazard	Daniel Boone Gulf Mart
Henderson	Matt's News & Gifts
Hopkinsville	Hobby Shop
Louisville	Hawley-Cooke Booksellers (2 Locations)
Middletown	Software City
Paducah	Radio Shack

LOUISIANA

Baton Rouge	City News Stand
Lockport	TV Doctor/Radio Shack
New Orleans	Sidney's News Stand Uptown
Monroe	The Book Rack

MAINE

Bangor	Magazines, Inc.
Brockton	Voyager Bookstore
Caribou	Radio Shack
Oxford	Books-N-Things
Sanford	Radio Shack

MARYLAND

College Park	University Bookstore

MASSACHUSETTS

Boston	Eastern Newsstand
Brockton	Voyager Bookstore
Cambridge	Out Of Town News
Ipswich	Ipswich News

MASSACHUSETTS (cont'd)

Littleton	Computer Plus
Lynn	North Shore News Co.
Swansea	Newsbreak, Inc.

MICHIGAN

Allen Park	Book Nook, Inc.
Birmingham	Border's Book Shop
Durand	Robbins Electronics
E. Detroit	Merit Book Center
Hillsdale	Electronics Express/Radio Shack
Holland	Fris News Company
Kalamazoo	The Book Raft
Lowell	Lowell Electronics
Muskegon	The Eight Bit Corner
Niles	Michiana News Service
Perry	Perry Computers
Riverview	Riverview Book Store
Roseville	New Horizons Book Shop

MINNESOTA

Burnsville	Shinder's Burnsville
Crystal	Shinder's Crystal Gallery
Edina	Shinder's Leisure Lane
Minneapolis	Shinder's (2 Locations)
Minnetonka	Shinder's Ridge Square
Roseville	Shinder's Roseville
St. Paul	Shinder's Annex
	Shinder's Maplewood
	Shinder's St. Pauls
Willmar	The Photo Shop

MISSOURI

Farmington	Ray's TV & Radio Shack
Flat River	Ray's TV & Radio Shack
Florissant	Book Brokers Unlimited
Jefferson City	Cowley Distributing
Kirksville	T&R Electronics
St. Louis	Book Emporium

MONTANA

Butte	Plaza Books

NEBRASKA

Lincoln	Nebraska Bookstore
Omaha	Nelson News

NEVADA

Carson City	Bookcellar
Las Vegas	Hurley Electronics
	Steve's Books & Magazines

NEW HAMPSHIRE

Keene	Radio Shack Associate Store
Manchester	Bookwrights
West Lebanon	Verham News Corp.

NEW JERSEY

Atlantic City	Atlantic City News Agency
Cedar Knolls	Village Computer & Software
Clinton	Micro World II
Pennsville	Dave's Elect. Radio Shack
Rockaway	Software Station

NEW MEXICO

Alamogordo	New Horizons Computer Systems
Albuquerque	Page One Newsstand
Santa Fe	Downtown Subscription

NEW YORK

Amherst	Village Green-Buffalo Books
Brockport	Lift Bridge Book Shop, Inc.
Brooklyn	Cromland, Inc.
Elmira Heights	Southern Tier News Co., Inc.
Fredonia	On Line: Computer Access Center
Hudson Falls	G.A. West & Co.
Huntington	Oscar's Bookshop
Johnson City	Unicorn Electronics
New York	Barnes & Noble—Sales Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pan Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop
	Jonil Smoke
	Penn Book
	Software City
	State News
	Walden Books
	World Wide Media Services
Pawling	Universal Computer Service
Rochester	Microcom Software
	Village Green
	World Wide News

NORTH CAROLINA	
Cary	News Center in Cary Village
Chapel Hill	University News & Sundry
Charlotte	Newsstand Int'l
Hickory	C² Books & Comics
Jacksonville	Michele's, Inc.
Kernersville	K & S Newsstand
Marion	Boomers Rhythm Center
Winston-Salem	K & S Newsstand (3 Locations)
	Rainbow News Ltd.
OHIO	
Akron	Churchill News & Tobacco
Canton	Little Professor Book Center
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoft
Cleveland	Erieview News
Columbiana	Fidelity Sound & Electronics
Columbus	B5 Software
	Micro Center
	The Newsstand
Dayton	Books & Co.
	Huber Heights Book & Card
	Wilke News
	Wright News & Books
Dublin	Book Barn
Fairborn	News-Readers
	Wilke's University Shoppe
Findley	Open Book
Kent	The News Shop
Lakewood	Lakewood International News
Lima	Edu-Caterers
Miamisburg	Wilke News
Parma	Bookmark Newscenter
Toledo	Leo's Book & Wine Shop
Warren	Book Nook, Inc.
Xenia	Fine Print Books
Youngstown	Plaza Book & Smoke Shop
OKLAHOMA	
Oklahoma City	Merit Micro Software
Taklequah	Thomas Sales, Inc. dba Radio Shack
Tulsa	Steve's Book Store
OREGON	
Eugene	Libra Books — Book Mark
Portland	Fifth Avenue News
	Rich Cigar Store, Inc.
	Sixth & Washington News
Salem	Capitol News Center
	Checkmate Book
PENNSYLVANIA	
Allentown	Owl Services
Altoona	Newborn Enterprises
Bryn Mawr	Bryn Mawr News
Corry	Corry Books & Cards
Feasterville	Global Books
King of Prussia	Gene's Books
Malvern	Personal Software
Reading	Smith's News & Card Center
Temple	Software Corner
West Chester	Chester County Book Co.
Wind Gap	Micro World
York	The Computer Center of York
	Tollgate Bookstore
RHODE ISLAND	
Newport	Bellevue News
SOUTH CAROLINA	
Charleston Hts.	Software Haus, Inc.
Clemson	Clemson Newsstand
Florence	Ray's #1
Greenville	Palmetto News Co.
Spartanburg	Software City
TENNESSEE	
Brentwood	Bookworld #5
Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Dickson	Highland Electronics
Knoxville	Anderson News Co.
	Davis-Kidd Bookseller
Memphis	Computer Center
Nashville	Davis-Kidd Booksellers
	Mosko's Place
	R.M. Mills Bookstore
Smyrna	Delker Electronics
TEXAS	
Big Spring	Poncho's News
Desoto	Maxwell Books
Elgin	The Homing Pigeon
Ft. Worth	Trinity News
Harlington	Book Mark
UTAH	
Provo	Valley Book Center
VIRGINIA	
Danville	K & S Newsstand
Hampton	Benders
Lynchburg	Self Serve Software
Norfolk	I-O Computers
	Turn The Page
Richmond	Volume I Bookstore
WASHINGTON	
Port Angeles	Port Book & News
Seattle	Adams News Co., Inc.
	Bulldog News
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes
WEST VIRGINIA	
Huntington	Nick's News
Logan	Stan's Electronics & Radio Shack
Madison	Communications, LTD
Parkersburg	Valley News Service
South Charleston	Spring Hill News
WISCONSIN	
Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Kenosha	R.K. News, Inc.
Madison	Pic A Book
	University Bookstore
Milwaukee	Juneau Village Reader
Waukesha	Holt Variety
ARGENTINA	
Cordoba	Information Telecommunicationes
AUSTRALIA	
Blaxland	Blaxland Computers
Kingsford	Paris Radio Electronics
CANADA:	
ALBERTA	
Banff	Banff Radio Shack
Bonnyville	Paul Tercier
Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
Edson	Radio Shack, asd
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound A.S.C. Radio Shack
Ft. Saskatchewan	Ft. Mall Radio Shack, ASC
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Lecombe	Brian's Electronics
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminster	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack
BRITISH COLUMBIA	
Burnaby	Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
BRITISH COLUMBIA (cont'd)	
Chilliwack	Charles Parker
Coquitlam	Cody Books LTD
Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Kelowna	Telesoft Marketing
Langley	Langley Radio Shack
Nelson	Oliver's Books
New Westminster	Cody Books LTD
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
Squamish	Kotyk Electronics
Vancouver	Active Components
	Friendlyware Computers
	Granville Book Co.
	Siliconnections Books LTD
100 Mile House	Tip Top Radio & TV
MANITOBA	
Altona	L.A. Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises
Winnipeg	J & J Electronics Ltd.
NEW BRUNSWICK	
Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.
NEWFOUNDLAND	
Botwood	Seaport Elec.
Carbonear	Slade Realties
NOVA SCOTIA	
Halifax	Atlantic News
ONTARIO	
Angus	Micro Computer Services
Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kenora	Donny "B"
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV
Toronto	Gordon and Gotch
QUEBEC	
LaSalle	Messageries de Presse Benjamin Enr.
Pont. Rouge	Boutique Bruno Laroche
SASKATCHEWAN	
Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound
YUKON	
Whitehorse	H & O Holdings
JAPAN	
Tokyo	America Ado, Inc.
PUERTO RICO	
East Isla Verde	The Color Computer Store
San Juan	Software City

Also available at all B. Dalton Booksellers, and selected Coles and W.H. Smith in Canada, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

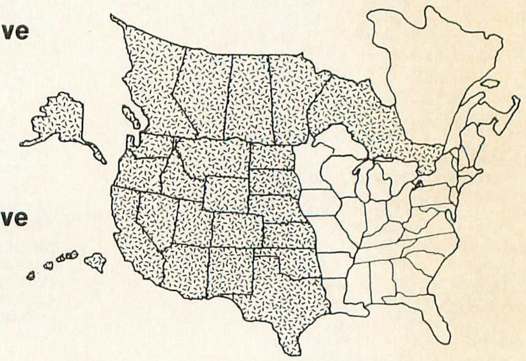
Advertisers Index

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning THE RAINBOW ***when you contact these firms.***

Alpha Software Technologies . . . 83
Arizona Small Computer Company . . . 127
Ark Royal Games . . . 79
Burke & Burke . . . 12
Cer-Comp . . . 94, 95
Cinsoft . . . 73
Cognitec . . . 29
Colorware . . . 19, 20, 21
Computer Center . . . 61
Computer Island . . . 109
Computer Plus . . . 3
CRC/Disto . . . 115
D.P. Johnson . . . 155
Dayton Associates of W. R. Hall, Inc. . . . 128, 129
Delphi . . . 60
Dr. Preble's Programs . . . 143
E-Z Friendly Software . . . 151
Eversoft . . . 53
Federal Hill Software . . . 45
Frank Hogg Laboratories . . . 54, 55
Game Point Software . . . 61, 139
Genie . . . 123
Gimmesoft . . . 22, 23
Granite Computer Systems . . . 81
GSW Software . . . 75
HawkSoft, Inc. . . . 135
Howard Medical . . . 66, 162
ICR Futuresoft . . . Outsert
J & R Electronics . . . 145
JR & JR Softstuff . . . 127
Kenneth Leigh Enterprises . . . 67
Magus Systems Engineering . . . 73
Metric Industries . . . 37
Michtron . . . BC
Micro Works, The . . . 133
Microcom Software . . . 9, 11, 13, 15, 16, 17,
Microtech Consultants Inc. . . . 107
MicroWorld . . . 65
NRI Schools . . . Between 130 & 131
Orion Technologies . . . 57
Owl-Ware . . . 69, 70, 71
Perry Computers . . . 157
PXE Computing . . . 7
Rainbow Adventure Book IV . . . 14
Rainbow Binder . . . 140
Rainbow Bookshelf . . . 118, 119
Rainbow Gift Subscription . . . 18
Rainbowfest . . . 33, 34, 35
Rainbow on Tape & Disk . . . IFC
Rulaford Research . . . 117
SD Enterprises . . . 25, 79, 81, 83, 85
Second City Software . . . 161
SpectroSystems . . . 135
SPORTSWARE . . . 39
STG Computers, Inc. . . . 53
Sugar Software . . . 97
Sundog Systems . . . 47
T & D Software . . . 41, 75, 137, 153
Tandy/Radio Shack . . . 49
Tepco . . . 31
True Data Products . . . 113
Try-O-Byte . . . 109
Vidicom Corporation . . . 139
Woodstown Electronics . . . 67
Zebra Systems . . . 131

▨ **Call:**
Belinda Kirby
Advertising Representative
(502) 228-4497

Call:
Kim Vincent
Advertising Representative
(502) 228-4492



The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059

FAX (502) 228-5121

MasterCard VISA C.O.D. CHECKS **ORDER**

Second City Software

P.O. Box 72956
Roselle, IL 60172
Voice: 312-653-5610
BBS: 312-307-1519

CoCo CALENDER DELUXE:
Organize all of your appointments with this 365 day Calender. Now with Hi-Res print driver for the DMP, CGP, Epson MX-80 and Star Gemini 10X printer. Please specify printer. 64k DISK........$19.95

BLACKJACK ROYALE:
Even your casino odds with this BlackJack card simulation and tutor! Program can be edited for different house rules. 64k DISK......................$16.95

BSE - BASIC SCREEN EDITOR:
Gives Basic a full-screen editor to supplement the regular EDIT commands. Works on the CoCo 1&2 and with the CoCo 3, WIDTH 32, 40 or 80 is supported! Complete screen cursor control with the arrow keys plus features to make EDITing Basic programs a snap! BSE, a must have CoCo utility. Our low price was the only corner that was cut on this quality program. 64k DISK.......................$19.95

CHECK-09MV - Version 2.0:
Finally, a program that interacts with MultiVue for FAST and EASY check balancing. **CHECK-09MV** and you can now take control of your bank checking account. No more waiting on your bank statement for an ending balance. **CHECK-09MV** will provide a check-by-check balance in an easy to use format that eliminates those monthly surprizes! Bring your money and you closer together and have the buck STOP HERE! Featuring an all new EDITING command. 512k DISK.....................................$25.95

CoCoMAX II: By Colorware
The 'CLASSIC' CoCo graphic program. Draw great works of art with the program that set a standard for all others to follow. Supported by a Hi-Res interface and numerous printer drivers for complete set-up. 64k DISK..$78.45

CoCoMAX III: By Colorware
All new program based off the 'CLASSIC' CoCo-Max II software. Allows for full animation, select 16 colors from a 64 color palette, fast & easy to use w/ pull down menus in a point-and-click environment. 128k or 512k DISK..$78.45

DISK UTILITY 2.1A PLUS:
A complete disk utility package for all CoCo's. Full Disk I/O for FORMAT, COPY, and BACKUP. Supports single or double sided 35 or 40 track drives. With DISK UTILITY 2.1A PLUS from SCS, you get TWO programs for ONE low price. DISK UTILITY for the CoCo 1 & 2 and DISK UTILITY for the CoCo 3. 64k DISK...............$23.95

CoCo KEYBOARD:
Program allows the user to utilize the function keys on the HJL-57 Pro-fessional, Deluxe CoCo, & Micronix keyboard. 32k DISK..........................$6.95

WARRIOR KING: By Sundog Systems
Battle monsters, gain magic & weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. An outstanding arcade game for the CoCo3! 128k DISK...........$29.95

TELEPATCH:
Turn Telewriter 64 into the best Word Processor for the CoCo 1&2! TELEPATCH is compatible with all CoCo's. Comes with complete documentations for easy upgrading and changes.
64k DISK..$24.95

SCHEMATIC DRAFTING PROCESSOR:
A 'FAST' and 'EASY TO USE' ELECTRONIC DRAFTING PROCESSOR. Create pro-looking diagrams using a 480x540 pixel screen with 6 viewing windows! Over '30' electronic symbols with 10 definable symbols. Even supports Logic gates & Multipin chips! Print hardcopy or save to disk for later editing. NOW CoCo 3 COMPATIBLE. 64k DISK..................................$22.95

OS-9 SOLUTION:
Tame the hostile environment of OS-9 with OS-9 SOLUTION! Replaces 20 of the command calls with single keystroke, menu driven commands. No more long and complex pathnames or syntaxes to remember! Works with either OS-9 Level One or Two......................................$24.95

TAPE/DISK UTILITY:
A utility package that transfers TAPE to DISK or DISK to TAPE automatically. If you just got your first disk drive, TAPE/DISK is a MUST HAVE program. Will print tape & disk directories to any supported printer. 64k DISK....$19.95

DISCOUNT SOFTWARE By ColorVenture
RAM DISK LIGHTNING DISK.............$16.95
PRINTER LIGHTNING.........................$16.95
BACKUP LIGHTNING..........................$16.95
BUY ALL THREE FOR ONLY.............$42.95

HI-RES JOYSTICK DRIVER................$19.95
MAX PATCH...$19.95
BUY BOTH FOR ONLY......................$34.95

HGRXDUMP:
Produce hardcopy graphic files with your DMP and CGP (B&W) printer. CoCo 1,2 & 3 compatible. 64k DISK..$19.95

MULTI-PAK CRACK:
Allows you to save your ROM-PAK programs over to disk...WHERE THEY BELONG! Includes POKES for problem PAKs and the new 16k PAKs. 64k DISK...............................**$24.95**

MAX-10: By Colorware
The 'Dazzling Word Processor & Document Creator for the CoCo3'. You asked for it and now it is available at an SCS special price.
128k DISK...$78.45

SECOND CITY SOFTWARE
Accepts MasterCard, Visa, C.O.D. and Check orders. Please add $2.50 for shipping ($4.50 for Canada orders) & allow 1 to 3 weeks for delivery. C.O.D. orders, add an additional $2.50.

SCS DOS:
Add 24 new disk commands with 2 Hi-Res Screens! Supports 40 track & Double Sided drives, 6ms stepping, auto disk search, error trapping and burnable into an EPROM. 64k DISK...........$24.95

MY DOS: By Chris Hawks
Supports accesses to double sided drives, able to use the J&M Controller with the CoCo 3, DIR commands simplified and a host of other special features. 64k DISK..$14.95

A-DOS 3:
The popular Disk Operating System from SpectroSystems for the CoCo 3. 128k DISK.........$34.95

SCS can custom 'burn' your purchased DOS program for only $15.00! This includes the price of the EPROM chip and the BURN charge. Call or write for details.

VIP LIBRARY:
This popular 'intergraded' package includes, VIP Writer, Terminal, Data Base, Calc and Disk Zap which can fix a diskette with I/O errors. SCS special price. 64k DISK................................$149.95

VIP WRITER III w/SPELL CHECKER:
All new and completely up-graded with expanded memory and pop-up main menus. You can also have up to 8 - 48k working text screens that will allow you to create 8 separate documents! Settle for only the best 100% ML word processor for the CoCo 3. 128k DISK..$79.95

VIP DATABASE III.......................................**$69.95**

SPECIAL: Order any VIP program from SCS, and receive an additional program at NO EXTRA CHARGE! Call or write for full details.

THE NEWSPAPER PLUS:
DeskTop Publishing for the CoCo 3? With the ALL NEW NEWSPAPER PLUS, you now can create complete and sophisticated Banners, Headlines along with Text Columns and Graphics. THE NEWSPAPER PLUS allows for importing different pictures, fonts and fill patterns from disk for that pro-look. Comes complete with 22 fonts and 50 clip art pictures. THE NEWSPAPER PLUS is an all new upgraded program based on the original NEWSPAPER program. SCS is the ONLY company authorized to handle THE NEWSPAPER PLUS program. Why buy the old, overpriced and outdated program when you can get the newest release for less!
128k DISK..$48.95

THE NEWSPAPER GRAPHICS DISK I:
The FIRST OFFICIAL supplementary program disk for THE NEWSPAPER. Contains '50' NEW PICTURE FILES, '10' NEW FILL PATTERNS and '3' ADDITIONAL FONT SETS! GRAPHICS DISK I is available only from Second City Software for $19.95

HOWARD MEDICAL COMPUTERS

1690 N. Elston • Chicago, IL 60622 • ORDERS (800) 443-1444 • INQUIRIES AND ORDER STATUS (312) 278-1440
Showroom Hours 8-5 M-F, 10-3 SAT

★ 5 STAR FINAL FEBRUARY '89 VERY COLD

24 HOUR ORDER LINE

DC-5 CONTROLLER

from Hard Drive Specialist gives great Radio Shack compatability and double sided access to DSDD Drives like Howard's DD-3. Two ROM sockets, one 24 pin and one 28 pin allows use of RS 1.1 ROM by jumper selection. Gold plated contacts reduce I/O Errors. **$75** ($2 Shipping)

NX-1000 STAR printer

- forward and backward tractor
- 4K input buffer **$189**
- 144 CPS

NX-1000 RAINBOW color printer **$289**

- four-color ribbon
- front panel font select
- single sheet and tractor feed at same time

Howard SP-C **$68.45**

- serial-to-parallel converter
- 300 - 9600 baud

Howard introductory special

- good until 2/16/89
- SP-C $29.95 with printer order
- Free coupon for newspaper plus ($48.95) with any other $15 order from Second City Software
- FREE shipping

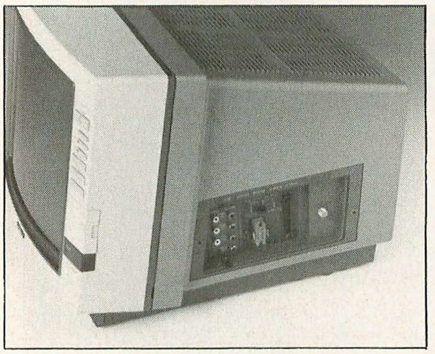
are lost when disk is reading or writing. Especially useful with OS-9, but also works with BASIC.

MONITOR

Sony KV-1311CR $499

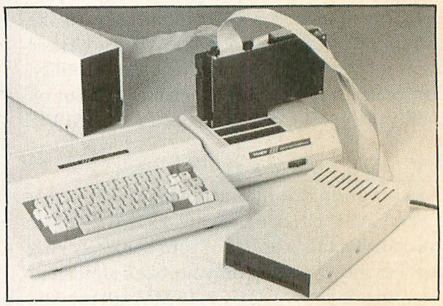
Regular $625 ($15 shipping)

• Vivid Color • Vertically flat 13″ screen • Monitor/Trinitron TV with remote control • 640 × 240 resolution at 15MHZ .37 mm Dot pitch • RGB analog & digital; TTL; and composite inputs • VCR inputs • Cable to CoCo 3 $36



HARD DRIVE ACCESSORIES

3′ Hard Drive Cable $20
Burke & Burke Interface 78.45
Clock Upgrade $20
RSB $39.95
TEAC 55B $118
Hard Drive ROM Boot $20



Hard Drive–Ready to Run!

20,000,000 Bytes or the equivalent to a 125 R.S. 501's on line are packed into this hard drive, pre installed and ready to run. All you need to do is plug it in and go! This complete easy to use package includes a Seagate 20 Meg Hard Drive, a Western Digital WD 1002-WX 1 Controller and interface* that plugs into slot #3 of multipack interface, plus the case & power supply. You even get a 1 year warranty. This 20 meg Hard Drive will work with IBM & clone. Basic driver, $29.95, lets you access this hard drive without need for OS-9.

HD-1 $499

* **Burke & Burke** ($9 Shipping)

Four free coupons from T & D subscriptions with hard drive order.
Offer ends 2/16/89

PAL UPGRADE FOR MULTI-PAK

specify for 26-3024 or 26-3124

14.95 ($2 ship)

"Guarantee" As good as Gold.

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.

24 HOUR ORDER LINE

800 / 443-1444

WE ACCEPT VISA • MASTERCARD • AMERICAN EXPRESS • C.O.D. OR CHECKS • SCHOOL P.O.
NEW — DISCOVER CARD

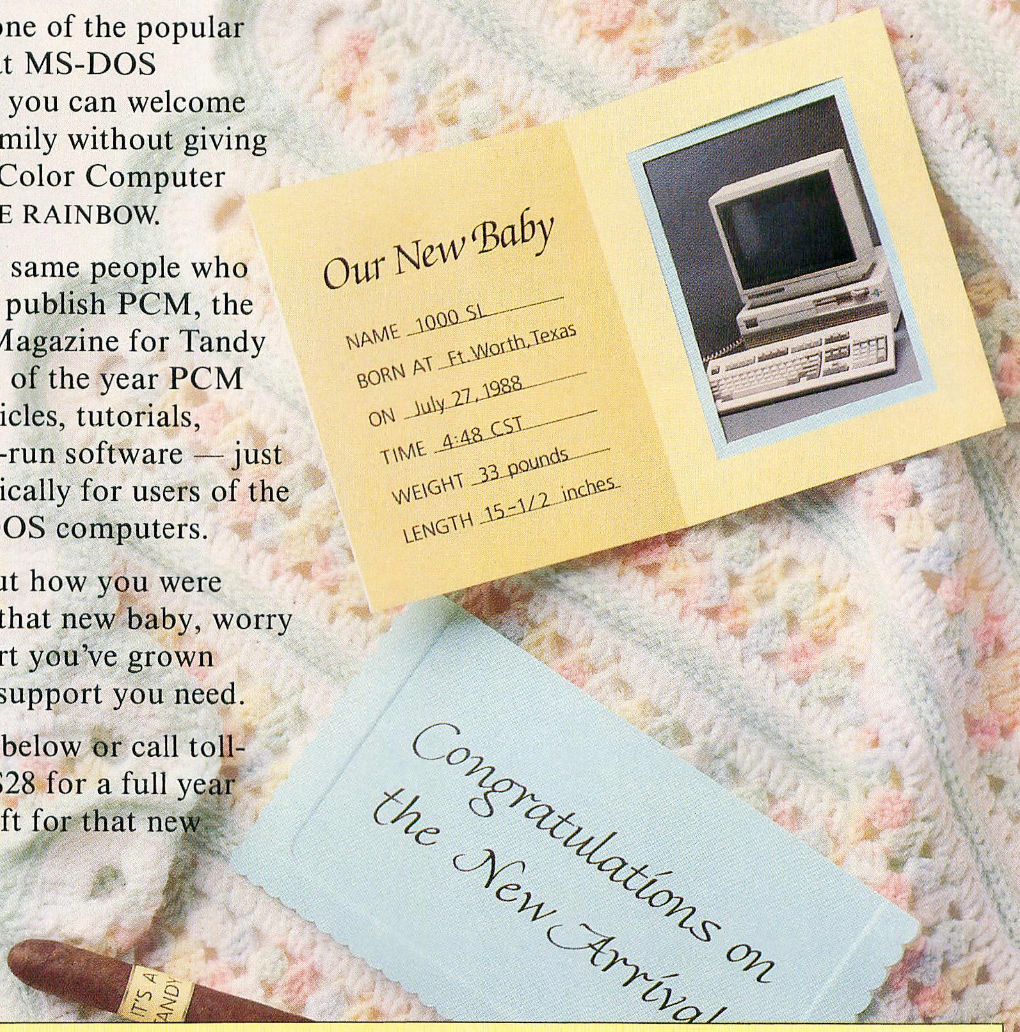
Welcome to the PCM Family

Are you the proud owner of one of the popular 1000s or any of the other great MS-DOS computers from Tandy? If so, you can welcome this new member into your family without giving up the support you and your Color Computer have always enjoyed from THE RAINBOW.

In case you haven't heard, the same people who bring you THE RAINBOW also publish PCM, the Premier Personal Computer Magazine for Tandy Computer Users. Each month of the year PCM offers 164 pages of feature articles, tutorials, product reviews and type-and-run software — just like THE RAINBOW, but specifically for users of the complete line of Tandy MS-DOS computers.

If you've been concerned about how you were going to learn to take care of that new baby, worry no more. PCM has the support you've grown accustomed to. PCM has the support you need.

To order, use the handy form below or call toll-free, (800) 847-0309. At only $28 for a full year subscription, it's the perfect gift for that new arrival from Tandy.



Our New Baby

NAME 1000 SL

BORN AT Ft. Worth, Texas

ON July 27, 1988

TIME 4:48 CST

WEIGHT 33 pounds

LENGTH 15-1/2 inches

SUBSCRIBE NOW and save up to 35% off the regular newsstand cost of PCM!

Please check one

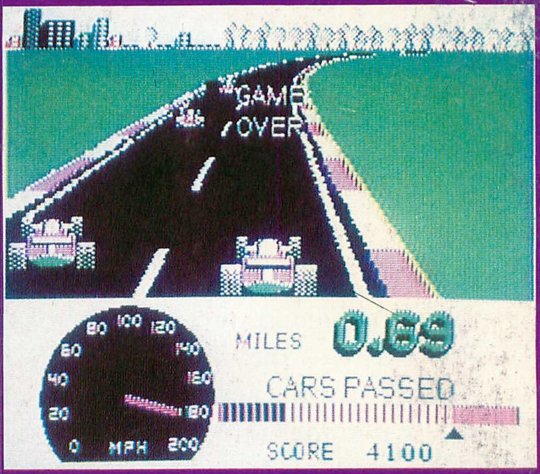
☐ 1 year (12 issues) $28* — 22% off the cover price
☐ 2 years (24 issues) $51* — 29% off the cover price
☐ 3 years (36 issues) $71* — 35% off the cover price

PCM The *Premier* **P**ersonal **C**omputer **M**agazine for Tandy ® Computer Users

NAME ____________________
ADDRESS ____________________
CITY ______________ STATE ______________ ZIP ______________
☐ New Address Subscription # ____________________
☐ Charge my subscription to: ☐ Visa ☐ MasterCard ☐ American Express
Account # ______________ Card Exp. Date ______________
Signature ____________________

*Subscriptions to PCM are $28 a year in the United States. Canadian rate U.S. $38. Surface rate to other countries U.S. $65. Air mail U.S. $85. Canadian and foreign subscribers. Inquire about multiple-year rates. Allow 6 to 8 weeks for first copy. U.S. currency only, please. In order to hold down non-editorial cost, we do not bill. Kentucky residents add 5% sales tax.

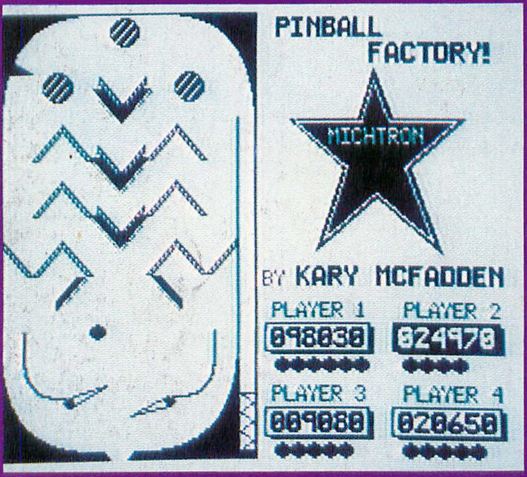
VISA MasterCard AMERICAN EXPRESS



Speed Racer

As the checkered flag drops your pulse rises in this lively arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for exciting racing. Vie for time as you glide through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but be quick! Some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery test your skills in this Pole Position™ type game.

32K Color Computer required...$34.95

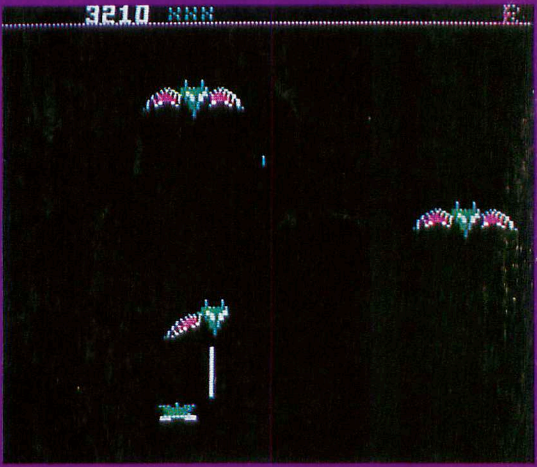


Pinball Factory

Video games come full circle in this tribute to the original arcade game, *Pinball*. Classic pinball springs to life as never before, with fresh new angles that only a computer can offer. Crisp graphics, sound, and fast smooth action give this machine-language arcade game a realistic, responsive feel you'll hardly believe. There are even "tilt" buttons that let you "bump" the machine. In addition to playing a great game of pinball, you can enjoy hours of creative pleasure as you design, build, edit, and play your own screens.

64K Color Computer required...$34.95

Demon Seed



The first waves of flying, diving, bloodthirsty bats are arriving. Move, fire, and move again. It's a never ending battle. If you are lucky enough to defeat the bats, be ready for a much greater challenge, The *Evil Demons* themselves. Destroy a wing and another takes its place. Only a direct hit can save you now. It will take great skill to triumph. If you do, then you better be ready for the *End*. The Demon Flag Ship descends to destroy your remaining ships. Your only hope is to penetrate the hull, break through the shield, and destroy the dreaded Gargoyle.

32K Color Computer required...$19.95

MichTron is always looking for programmers and programs. If you are interested in working with one of the most respected company's in the computer software field please give us a call.

MichTron®

For more information
on these or other fine products
call our knowledgeable staff!

576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

Dealer inquiries welcome.
Visa and Mastercard accepted.